Yosemite National Park

National Park Service
U.S. Department of the Interior

User Capacity Management Program for the Merced Wild and Scenic River Corridor

February 2004

United States Department of the Interior

NATIONAL PARK SERVICE
Yosemite National Park
P. O. Box 577
Yosemite, California 95389

IN REPLY REFER TO:
D18 (YOSE)

February 23, 2004

Dear Yosemite Friends,

The Merced Wild and Scenic River corridor is as central to the identity of Yosemite National Park as its plunging waterfalls and granite domes. To address the range of issues relating to visitor use and the protection and enhancement of what the Wild and Scenic Rivers Act calls "Outstandingly Remarkable Values," the National Park Service has prepared the *User Capacity Management Program for the Merced River Corridor.*

This document describes the various management tools employed by the National Park Service to address visitor use within the 81 miles of the Merced River corridor. From guiding legislation to systems that have been in place for decades to the latest park efforts, the program provides an elaborate network of protection for the Merced River's Outstandingly Remarkable Values.

One such tool is the Visitor Experience and Resource Protection (VERP) framework for the Merced River corridor in Yosemite. As called for in the *Merced Wild and Scenic River Comprehensive Management Plan,* Yosemite's VERP program serves as a report card to measure how well the park is protecting and enhancing the river's Outstandingly Remarkable Values. Through VERP, the park has adopted a set of indicators and standards that identify and quantify the kinds and levels of use that are appropriate, as well as where and when such uses should occur. These prescriptions—coupled with a monitoring program—give park managers the information and rationale needed to make sound, science-based decisions about visitor use. If a standard is reached or exceeded, management action can be taken.

The iterative VERP model is just one tool the park uses to measure success. The document before you today represents the beginning of a greater, ongoing discussion of user capacity in the river corridor. We will keep you informed as the National Park Service continues working to safeguard the Merced River and its unique values for today and for future generations.

Sincerely,

Michael J. Tollefson
Superintendent

Table of Contents

Chapter 1
Introduction

Purpose of this Document

Addressing use in a national park as vast and complex as Yosemite requires a network of mechanisms and methods to assist park managers in making decisions. This document describes all of the elements of Yosemite National Park's User Capacity Management Program for the Merced River Corridor. It also presents a status report on the various management tools employed by the National Park Service to address visitor use within the 81 miles of the Merced River corridor that spans Yosemite National Park. It includes an overview of the park's implementation of the Visitor Experience and Resource Protection (VERP) framework, day-to-day practices, and those programs that have been in place for decades. In concert, these tools provide an elaborate network of protection and enhancement for the Outstandingly Remarkable Values of the Merced Wild and Scenic River corridor.

This report outlines the following components in the Yosemite User Capacity Management Program for the Merced River Corridor:

- **GOVERNING MANDATES** The protection of park resources—including the Outstandingly Remarkable Values of the Merced River corridor—falls within the governing mandates established by the park's enabling legislation, federal and state legislation, Director's Orders, along with the park's regulations, policies, and mitigation measures (known as Best Management Practices).

- **FACILITY LIMITS** In the developed areas of the river corridor (which account for approximately 17 miles of the Merced River in Yosemite Valley, El Portal, and Wawona), capacity limits are set for both concession-operated and administrative facilities. These include campgrounds, lodging facilities, food and retail concessions, parking areas, administrative offices, employee housing, maintenance facilities, and utilities. According to the desired conditions established in the *Merced Wild and Scenic River Comprehensive Management Plan* and the *Yosemite Valley Plan*, limits on facilities are directly tied to the protection and enhancement of Outstandingly Remarkable Values in the Merced River corridor.

- **WILDERNESS CAPACITIES** Since 1972, the Trailhead Quota System has addressed visitor use and its effect on the backcountry areas of Yosemite, which includes approximately 51 miles of the Merced River corridor. Using the Wilderness Impacts Monitoring System (WIMS), the park regularly monitors water quality, vegetation, soils, campsite condition, and trails—all of which are linked to the quality of the visitor experience in Yosemite's backcountry.

- **MANAGEMENT ZONING** Management zoning throughout the Merced River corridor (as adopted in the *Merced Wild and Scenic River Comprehensive Management Plan*) classifies park areas and prescribes future desired resource conditions, visitor activities, and facilities. The zoning adopted through the Merced River Plan—including the River Protection Overlay—was developed to protect and enhance the Outstandingly Remarkable Values within each river segment. Zoning prescriptions address capacity by listing the typical activities and allowed facilities, as well as facilities or uses not allowed in each zone.

- **VERP FRAMEWORK** The Visitor Experience and Resource Protection (VERP) framework is an iterative process of monitoring the effects of visitor use against a set of quantified standards and indicators. Since 2000, Yosemite National Park has been engaged in implementing the framework's nine elements. This report presents some of the most recent efforts in the VERP process, namely identifying indicators and specifying standards for management zones within the Merced River corridor, along with a description of monitoring techniques and schedules. The final element in the framework is taking management action should monitoring indicate that such steps are necessary. Some potential options for management action are included within each standard and indicator, and guidance for taking management action is described in many of the chapters of this document.

- **PROGRAMS THAT FOCUS ON OTHER OUTSTANDINGLY REMARKABLE VALUES** Specific legislation and programs are in place to guide the National Park Service in its protection and enhancement of the cultural Outstandingly Remarkable Values within the Merced River corridor. Also the park is under several mandates that guide protection of special-status wildlife species, which are part of the biological Outstandingly Remarkable Value within nearly all of the segments of the Merced River corridor

Background

In the past, the question of how much public use is appropriate in a national park has been framed in terms of what is known as the visitor "carrying capacity." The concept originated in the 1930s as a way to measure the amount of livestock grazing possible within a given area of land. This was expressed as a set number of animals that the land could support. In contrast, when the focus is upon preserving the integrity of whole ecological systems and providing visitor enjoyment and education—as is the case in national parks—the situation is more complex. Here, capacity is determined by what types and levels of visitor use can be accommodated while maintaining social and resource conditions consistent with the purposes of the park and the goals of its mission.

The National Park Service administers Yosemite under a series of statutory authorities passed in the late 1800s and early 1900s that includes the National Park Service Organic Act of 1916. These authorities mandate that the National Park Service protect and preserve the park's natural and cultural resources while providing for the enjoyment and education of park visitors "in such a means as will leave them unimpaired for the enjoyment of future generations." The very mission of the National Park Service calls for allowing use of parks, but not to the detriment of the values that make them unique.

In 1987, Congress designated the Merced as a Wild and Scenic River to protect the river's free-flowing condition and to protect and enhance its unique values for the benefit and enjoyment of present and future generations (16 USC 1271). This designation gives the Merced River special protection under the Wild and Scenic Rivers Act and requires the National Park Service to address "user capacity[1]" for the river corridor in the comprehensive management plan for the river.

The National Park Service's objective in addressing user capacities is first to establish desirable conditions for both the quality of visitor experiences and the protection and enhancement of the river's Outstandingly Remarkable Values, and second to manage visitor use to maintain these conditions. Scientific data provide guidance in the development of these desired conditions. Park managers—with input from the public and with a basis in scientific and legal knowledge—make judgments regarding what conditions are desirable given the park's mission and context.

[1] For the purpose of this report, the National Park Service adheres to the term "user capacity" as used in the Wild and Scenic Rivers Act. It is synonymous with "carrying capacity."

The User Capacity Mandate

The National Park Service is required by law to address user capacity in planning for parks. Relevant legislation and guidelines include the National Parks and Recreation Act, the Wild and Scenic Rivers Act, and the 1982 Wild and Scenic Rivers Guidelines. These are briefly summarized below.

1978 National Parks and Recreation Act (Public Law 95-625). Requires each park's general management plan to include "identification of and implementation commitments for visitor carrying capacities for all areas of the [park]."

Wild and Scenic Rivers Act, §3(d)(1). "The [comprehensive management plan] shall address resource protection, development of lands and facilities, user capacities, and other management practices necessary or desirable to achieve the purpose of this act."

Wild and Scenic Rivers Act, §10(a). "Each component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which cause it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its aesthetic, scenic, historic, archeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development of the special attributes of the area."

1982 Interagency Guidelines on the Wild and Scenic Rivers Act. Defines user capacity as: "the quantity of recreation use which an area can sustain without adverse impact on the Outstandingly Remarkable Values and free-flowing character of the river area, the quality of recreation experience, and public health and safety."

What are Outstandingly Remarkable Values?

Before a river can be designated Wild and Scenic, it must meet certain requirements for eligibility. One of the primary bases for determining eligibility is the identification of the river's Outstandingly Remarkable Values. The Wild and Scenic Rivers Act defines these values as those characteristics that make the river worthy of special protection. Outstandingly Remarkable Values can include scenery, recreation, fish and wildlife, geology, history, culture, and other similar values.

In order to be considered, two vital questions must be answered to establish the criteria for selection of Outstandingly Remarkable Values:

- Is the value river-related or river-dependent?
- Is the value rare, unique, or exemplary in a regional or national context?

The Merced River Plan includes a set of Outstandingly Remarkable Values for the main stem and South Fork of the Merced River that were refined through the public planning process. The following are categories of Outstandingly Remarkable Values used in the Merced River Plan:

Scientific – Because much of the watershed is largely within designated Wilderness in Yosemite, the Merced River corridor constitutes a rich resource for scientific study. Scientific Outstandingly Remarkable Values relate to the Merced River's value for research.

Scenic – Yosemite National Park is recognized worldwide for its spectacular scenic wonders. Scenic resource Outstandingly Remarkable Values include spectacular views from the river and its banks and include a number of viewpoints that exhibit the sublime character of Yosemite National Park.

Geologic Processes/Conditions – Unique to the Merced River corridor is the dramatic evidence of natural processes at work for thousands of years. Geologic process and geologic condition Outstandingly Remarkable Values are generally related to glaciation, granite domes, river processes, and unique geologic features.

Recreation – The vast spectrum of recreational opportunities through-out the Merced River corridor – from fishing and hiking to enjoying solitude and natural sounds along the river – all contribute to a special Yosemite experience. Outstandingly Remarkable Values have been identified relating to those activities unique to the Merced River.

Biological – From the presence of the Wawona riffle beetle to the diversity of neotropical songbirds, the Merced River is a vital component in determining the overall health of riparian communities. Biological resource Outstandingly Remarkable Values have been identified and include riverine habitats such as riparian forests, meadows, and the aquatic environment of the river and associated special-status species.

Cultural – For thousands of years, Yosemite's human residents have lived within the Merced River corridor. Evidence of historic and prehistoric lifeways tells the story of the Merced River's unique heritage. Cultural resource Outstandingly Remarkable Values include river-related cultural resources that are not intended to divert the free flow of the river and that are either eligible for or listed on the National Register of Historic Places.

Hydrologic Processes – A logjam hundreds of years old crosses the river in Little Yosemite Valley. The river meanders through Yosemite Valley, and then plunges 2,000 feet in elevation over a course of six miles through the gorge. Such distinct features characterize the value of the Merced River's unique river processes. Outstandingly Remarkable Values related to hydrologic processes generally include pristine water quality (in wilderness segments), exceptionally steep gradients, extraordinary examples of cascades, and examples of unique hydrologic conditions (e.g., oxbows, unique wetlands, fluvial processes, and an active flood regime).

Merced River Plan Goals

The *Merced Wild and Scenic River Comprehensive Management Plan* (Merced River Plan), as adopted by the National Park Service, provides direction and guidance on how best to manage visitor use, development of lands and facilities, and resource protection within the river corridor. It applies seven management elements to prescribe future desired conditions: boundaries, classifications, Outstandingly Remarkable Values, the Section 7 determination process, River Protection Overlay, management zoning, and the Visitor Experience and Resource Protection (VERP) framework.

The goals of the Merced River Plan are to:

Protect and enhance river-related natural resources

- maintain and restore natural function of riparian areas, wetlands, and floodplains
- habitat at natural levels of complexity and diversity
- water quality at highest possible levels

Protect and restore natural hydrological and geomorphic processes

- hydrologic processes: natural flood cycles, channel dynamics, interconnection of ground and surface water systems

Protect and enhance river-related cultural resources

- maintain important links to human history

Provide diverse river-related recreational and educational experiences

- broad spectrum of opportunities
- appropriate access to the river

Provide appropriate land uses

- efficient, safe, and appropriate land uses
- facilities located in areas able to withstand high levels of visitor use
- roads constructed for safety, while protecting free flow of the river

Public Involvement

Each person has an important perspective on the management of Yosemite National Park and can make a unique contribution to various planning efforts. When changes to facilities are proposed, the National Park Service is required by the National Environmental Policy Act (NEPA) to present an analysis of environmental impacts to the public. Yosemite project teams solicit comments during what is referred to as project "scoping," as well as upon the release of a draft document. The public is also encouraged to send in general comments for consideration by park staff at any time. Visitor use is a regular topic of consideration in all of the park's environmental compliance documents. The public is asked to voice their comments and concerns regarding how they use the park and how a given project may impact that use. In this way, the National Park Service listens to the public. Since 2000, the public has provided comments relating to visitor use and capacity issues through both the *Merced Wild and Scenic River Comprehensive Management Plan* and the *Yosemite Valley Plan*, as well as through the release of several implementation projects.

It is important to note that the development of standards and indicators is a part of the park's ongoing implementation of the VERP framework. Today, park staff and subject-matter experts continue to draft and refine additional standards and indicators for future implementation. These will be presented to the public.

As the park moves forward with its User Capacity Program for the Merced River Corridor, the public is invited to engage in further conversations. The National Park Service conducts regular open houses where information and updates regarding the User Capacity Program will be available. At open houses, project and resource managers are available to discuss the monitoring efforts underway, the results of which will also be made public. Those interested in developments regarding Yosemite's User Capacity Program for the Merced River Corridor can also sign up to receive the park's regular electronic newsletter.

Chapter 2
Governing Mandates that Address User Capacity

The National Park Service addresses user capacity and the protection and enhancement of Outstandingly Remarkable Values of the Merced River corridor through a number of pieces of legislation, as well as guiding regulations and policies. This chapter outlines the legislation, regulations, policies, and programs that address user capacity and the protection and enhancement of Outstandingly Remarkable Values of the Merced River corridor.

Wild & Scenic Rivers Act

Section 4(d)(1) of the Wild and Scenic Rivers Act specifies that "For rivers designated on or after January 1, 1986, the Federal agency charged with the administration of each component of the National Wild and Scenic Rivers System shall prepare a comprehensive management plan for such river segment to provide for the protection of the river values. The plan shall address resource protection, development of lands and facilities, user capacities, and other management practices necessary or desirable to achieve the purposes of this Act."

The *Merced Wild and Scenic River Comprehensive Management Plan* (Merced River Plan) is the comprehensive management plan for the Merced River.[2] User capacities are addressed through the management elements of the Merced River Plan (such as river classification, Outstandingly Remarkable Values, the River Protection Overlay, and management zoning), and the Visitor Experience Resource Protection (VERP) framework that was included in the Merced River Plan. The VERP framework is further detailed in this document along with the other elements of this User Capacity Management Program.

Wilderness Act

The Wilderness Act (Public Law 88-577 [16 U.S. C. 1131-1136]) originated out of a national concern over trends affecting roadless areas in national forests. But it was also applied to lands in the National Park System because of concerns about the erosion of roadless blocks within national park units. The Wilderness Act was a zoning system to establish that certain blocks of land would be maintained permanently as wild lands free of roads, resorts, or other significant human-made intrusions.

The Wilderness Act supplements the National Park Service's basic statutory authority. It serves as a permanent zoning device, with national legal sanction, determining where roads and structures will not intrude.

A large segment of the Merced Wild and Scenic River flows through designated Wilderness areas. The Wilderness Act of 1964 and the California Wilderness Act of 1984 provide guidance for management within designated Wilderness. The purpose of the Wilderness Act of 1964 is to secure the benefits of an enduring resource of wilderness for present and future generations. Wilderness is defined in the act as an area managed to preserve its natural conditions, which is affected primarily by the forces of nature, and which has outstanding opportunities for solitude and an unconfined type of recreation These goals complement the intent of the Wild and Scenic Rivers Act as it applies to the areas of the Merced River corridor classified as Wild. The California Wilderness Act established 704,624 acres of designated Wilderness and 927 acres of potential Wilderness additions within Yosemite National Park. Most of the Merced River in Yosemite National Park flows through designated Wilderness areas, which are

[2] In response to a ruling issued on October 27, 2003 by the U.S. Court of Appeals for the Ninth Circuit, the Merced River Plan will be amended at a later date to address the revision of the boundary in the El Portal Administrative Site.

managed under the 1989 *Wilderness Management Plan*. The Merced River Plan's management approach to wild river segments complements the *Wilderness Management Plan*, which includes public use limits for Yosemite's designated Wilderness areas.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) is used by federal agencies as the "basic charter for protection of the environment. It establishes policies, sets goals, and provides means for carrying out the policy. NEPA procedures insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. Director's Order 12 sets the policy and procedure by which the National Park Service complies with NEPA.

The National Park Service adheres to NEPA guidelines when proposing changes to facilities in Yosemite National Park. Capacity cannot be increased or decreased without undertaking appropriate environmental analysis of potential impacts.

Tools and actions to manage visitor use and their impacts are described in either the *Merced Wild and Scenic River Comprehensive Management Plan/Final Environmental Impact Statement*, the *Final Yosemite Valley Plan/Supplemental Environmental Impact Statement*, and other approved plans that apply to sections of the river corridor (such as the *Wilderness Management Plan).* However, some actions may require additional planning and compliance prior to implementation, if:

- Proposed actions extend beyond the area identified and analyzed.
- Proposed actions involve an appreciable change in function and capacity from that discussed.
- Previously unknown resources are discovered (e.g., archeological site, or special-status plant or animal species) during the design.

Often in such cases, additional NEPA compliance—including public review and comment—is needed. As action plans and site designs are prepared, design alternatives would be made available to the public, for comment and consideration.

If an action from an approved plan (such as the *Yosemite Valley Plan)* can be implemented as described (consistent with the application of prescribed Best Management Practices and mitigation), or if the action under normal circumstances would not be considered a major federal action or have measurable impacts, the action may be formally documented through a categorical exclusion/decision record and the public notified. Consultation with American Indian groups, federal, state and local governments, and others, would occur as needed.

National Historic Preservation Act

The National Historic Preservation Act (NHPA), Section 106, directs the federal agencies to take into account the effects of their actions on historic properties; and, to afford the Advisory Council a reasonable opportunity to comment. As described under NEPA (above), some of the actions needed to manage visitor use and their impacts are described in the *Merced Wild and Scenic River Comprehensive Management Plan/Final Environmental Impact Statement* or the *Yosemite Valley Plan/Supplemental Environmental Impact Statement*. Some may require additional compliance with Section 106, as well as consultation with the California State Historic Preservation Officer, the Advisory Council on Historic Preservation, and Native American tribes. This User Capacity Management Program includes procedures and protocols to protect and enhance cultural Outstandingly Remarkable Values.

Archeological Resources Protection Act

The Archeological Resources Protection Act (ARPA) prohibits excavation, removal, damage, and other actions that alter or deface archeological resources on public lands. The authorities granted under ARPA allow the park to take action as needed to protect and enhance the cultural Outstandingly Remarkable Value of the Merced River. The act prohibits trafficking in archeological resources obtained in violation of ARPA or another federal law, and provides for civil and criminal penalties for violation. The act authorizes federal agencies to permit excavation and removal of archeological resources on public lands provided certain stipulations are met. The act also requires federal agencies to maintain as confidential any information regarding the nature and location of archeological resources, and to establish a program to increase public awareness of the significance of archeological resources on public lands, and the need to protect such resources.

16 USC Section 1a-7

This statute requires units within the National Park System to prepare general management plans. In particular, such plans are required to include "indications of types and general intensities of development (including visitor circulation and transportation patterns, systems and modes) associated with public enjoyment and use of the area, including general locations, timing of implementation and anticipated costs." These plans are also required to present "identification of and implementation commitments for visitor carrying capacities for all areas of the unit."

The *Merced Wild and Scenic River Comprehensive Management Plan* and the *Yosemite Valley Plan* have amended parts of the park's 1980 *General management Plan*. Elements of each of these plans provide direction for implementation of the User Capacity Management Program for the Merced River Corridor.

CFR (Title 36)

The Code of Federal Regulations (CFR) is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government. It is divided into 50 titles that represent broad areas subject to federal regulation. Each volume of the CFR is updated once each calendar year and is issued on a quarterly basis.

Title 36, Chapter 1 part 2 contains the regulations that pertain to resource protection, public use, and recreation within national parks. These regulations "provide for the proper use, management, government, and protection of persons, property, and natural and cultural resources under the jurisdiction of the National Park Service. These regulations will be utilized to fulfill the statutory purposes of units of the National Park System: to conserve scenery, natural and historic objects, and wildlife, and to provide for the enjoyment of those same resources in a manner that will leave them unimpaired for the enjoyment of future generations."

Title 36, Chapter 1 part 2 establishes protection measures for natural and cultural resources (e.g., food storage, wildlife protection, preservation of archeological resources, etc.) and dictates the allowed public uses within a national park (e.g., campfires, picnicking, winter activities, livestock use, special events, etc.).

Regulations pertaining to the El Portal Administrative Site are specifically contained within Chapter 1, part 34.

The regulations in Title 36 of the Code of Federal Regulations will be used by the National Park Service as one of the tools to manage and restrict visitor use within the 81 miles of the Merced River corridor that exist within Yosemite National Park.

Clean Water Act

Maintaining water in its natural condition, free of pollutants generated by human activity, is necessary for the protection and enhancement of the scientific and hydrologic process Outstandingly Remarkable Values of the Merced River. The authorities granted under the Clean Water Act and NPS Policies referenced below allow the park to take action as needed to protect and enhance the hydrologic and scientific Outstandingly Remarkable Values of the Merced River.

The goal of the National Park Service as expressed in *Management Policies* is to preserve and protect entire ecosystems, an integral part of which are water and aquatic resources. In addition, the Clean Water Act, passed in 1972 and substantially amended in 1977 and 1987, was designed to restore and maintain the integrity of the nation's waters, including those of the National Park System. In addition, Section 313 of the Clean Water Act requires the National Park Service, in implementing its management activities, to "…comply with all federal, state, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution in the same manner and to the same extent as any non-governmental entity including the payment reasonable service charges." (From Reference Manual 77, Natural Resource Management, under Freshwater Resource Management [then, Water Resources Management]). The NPS *Management Policies* states that:

> The National Park Service will perpetuate surface and groundwaters as integral components of park aquatic and terrestrial ecosystems... The Service will determine the quality of park surface and ground water resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks. The Service will:
>
> - Work with appropriate governmental bodies to obtain the highest possible standards available under the Clean water Act for the protection of park waters;
> - Take all necessary actions to maintain or restore the quality of surface waters and ground waters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations; and
> - Enter into agreements with other agencies and governing bodies, as appropriate, to secure their cooperation in maintaining or restoring the quality of park water resources.

NPS Management Policies & Director's Orders

The National Park Service has several sources of detailed written guidance to help managers make day-to-day decisions. The primary source of guidance is the 2001 edition of *Management Policies*. The issue of user capacities is addressed in Chapter 8: Use of Parks. In particular, it states:

> **8.2.1 Visitor Carrying Capacity** Visitor carrying capacity is the type and level of visitor use that can be accommodated while sustaining the desired resource and visitor experience conditions in the park. By identifying and staying within carrying capacities, superintendents can prevent park uses that may unacceptably impact the resources and values for which the parks were established. For all zones, districts, or other logical management divisions within a park, superintendents will identify visitor carrying capacities for managing public use. Superintendents will also identify ways to monitor for, and address, unacceptable impacts to park resources and visitor experiences.
>
> When making decisions about carrying capacity, superintendents must utilize the best available natural and social science and other information, and maintain a comprehensive administrative record relating to their decisions. The decision making process should be based on desired resource conditions and visitor experiences for the area; quality indicators and standards that define the desired resource conditions and visitor experiences; and other factors that will lead to

logical conclusions and the protection of park resources and values. The level of analysis necessary to make decisions about carrying capacities is commensurate with the potential impacts or consequences of the decisions. The greater the potential for significant impacts or consequences to park resources and values (or the opportunities to enjoy them), the greater the level of study and analysis needed to support the decisions.

The general management planning process will determine the desired resource and visitor experience conditions that are the foundation for carrying capacity analysis and decision making. If a general management plan is not current or complete, or if more detailed decision- making is required, a carrying capacity planning process, such as the Visitor Experience and Resource Protection (VERP) framework, should be applied in an implementation plan or an amendment to an existing plan. If the time frame for making decisions is insufficient to allow the application of a carrying capacity planning process, then superintendents must make decisions based on the best available scientific and other information. In either case, such planning must be accompanied by appropriate environmental impact analysis, in accordance with Director's Order #12.

As use changes over time, superintendents must continue to decide if management actions are needed to keep use at acceptable and sustainable levels. If indicators and standards have been prescribed for an impact, the acceptable level is the prescribed standard. If indicators and standards do not exist, the superintendent must determine how much impact can be tolerated before management intervention is required.

If and when park uses reach a level at which they must be limited or curtailed, the preferred choice will be to continue uses that best meet the criteria listed in section 8.2 for preferred uses, and to limit or curtail those that least meet those criteria.

(See Decision-making Requirements to Avoid Impairments 1.4.7; General Management Planning 2.3.1; Carrying Capacity 5.3.1.6; Management of Recreational Use 8.2.2.1. Also see Director's Order #2: Park Planning)

This management policy also guides the park in ways to manage visitor use:

8.2.2 Recreational Activities The National Park Service will encourage, allow, or not allow recreational activities according to the criteria listed in section 8.2. Examples of recreational activities that may be encouraged or allowed include, but are not limited to, boating, camping, bicycling, fishing, hiking, horseback riding and packing, outdoor sports, picnicking, scuba diving, crosscountry skiing, caving, mountain and rock climbing, and swimming. However, not all of these activities will be appropriate or allowable in all parks; that determination must be made on the basis of park- specific planning. Service- wide regulations addressing aircraft use, off- road bicycling, hang gliding, off- road vehicle use, personal watercraft, and snowmobiling require that special, park- specific regulations be developed before these uses may be allowed in parks.

The Service will monitor new or changing patterns of use or trends in recreational activities, and assess their potential impacts on park resources. A new form of recreational activity will not be allowed within a park until after an environmental analysis has determined that it will not result in unacceptable impacts on park resources. Restrictions placed on recreational uses that have been found to be appropriate will be limited to the minimum necessary to protect park resources and values, and promote visitor safety and enjoyment.

8.2.2.1 Management of Recreational Use Superintendents will develop and implement visitor use management plans and take management actions, as appropriate, to ensure that recreational uses and activities within the park are consistent with its authorizing legislation or proclamation and do not cause unacceptable impacts to park resources or values. Depending on local park needs and circumstances, these plans may be prepared as coordinated activity- specific documents (such as river use plan, backcountry use plan, wilderness management plan, off- road vehicle use plan, winter use plan); as action plan components of a resource management plan or general management plan; or as a single integrated plan that addresses a broad spectrum of recreational activities. Regardless of their format or complexity, visitor use management plans will (1) contain specific, measurable management objectives related to the activity or activities being addressed; (2) be periodically reviewed and updated; and (3) be consistent with the carrying capacity decisions made in the general management plan.

The Service will seek consistency in recreation management policies and procedures on both a Service-wide and interagency basis to the extent practicable. However, because of differences in the enabling legislation and resources of individual parks, and differences in the missions of the Service and other federal agencies, an activity that is entirely appropriate when conducted in one location may be inappropriate when conducted in another. The Service will consider a park's purposes and the effects on park resources and visitors when determining the appropriateness of a specific recreational activity.

Superintendents will consider a wide range of techniques in managing recreational use to avoid adverse impacts on park resources and values, or desired visitor experiences. Examples of appropriate techniques include visitor information and education programs; separation of conflicting uses by time or location; "hardening" sites; modifying maintenance practices; and permit and reservation systems. Superintendents may also use their discretionary authority to impose local restrictions, public use limits, and closures, and designate areas for a specific use or activity (see 36 CFR 1. 5). Any restriction of appropriate recreational uses will be limited to what is necessary to protect park resources and values, to promote visitor safety and enjoyment, or to meet park management needs. To the extent practicable, public use limits established by the Service will be based on the results of scientific research and other available support data. However, an activity will be restricted or prohibited when, in the judgment of the superintendent, its occurrence, continuation, or expansion would (1) violate the criteria listed in section 8. 2, or (2) conflict with the findings of a carrying capacity analysis, and there is no reasonable alternative that would avoid or satisfactorily mitigate the violation or conflict.

(See Park Planning Processes 2.3; Wilderness Management Planning 6.3.4.2; General Policy 6.4.1; Carrying Capacity 8.2.1; Commercial Visitor Services 8.2.2.2; River Use 8.2.2.3, Backcountry Use 8.2.2.4; fishing 8.2.2.5; Hunting and Trapping 8.2.2.6; Off- road Vehicle Use 8.2.3.1; Snowmobiles 8.2.3.2; Visitor Safety 8.2.5.1; Native American Use 8.5; Special Park Uses 8.6; Collecting Natural Products 8.8. Also see Director's Order #2: Park Planning, and #12: Conservation Planning and Environmental Impact Analysis)

Guidance from the Management Policies will be used by the park in making decisions about when and how to take management actions to address visitor used in the Merced River corridor. For example, this guidance will be used to inform management actions that may grow out of Yosemite's VERP program.

Superintendent's Compendium

Under the authority of 16 USC Section 3 and Title 36 CFR chapter 1, parts 1-7, the Superintendent's Compendium establishes specific regulations and policies for Yosemite National Park. It is the written determination which explains the reasoning behind the Superintendent's use of discretionary authority in matters relating to visitor use. For example, climbing routes can be closed for a period of time under the authority of the Superintendent's Compendium in order to protect Peregrine falcon nesting sites along Yosemite Valley walls. In addition to use limits prescribed in the *General Management Plan,* the Superintendent's Compendium establishes additional limits and restrictions on use as cited below.

Public Use Limits:

- 1,290 overnight trailhead entries into Yosemite Wilderness can be made daily.
- Day users traveling on established trails my travel in groups of up to 35. On cross-country (off trail) routes, day users may travel in groups up to 8 persons.

This is in accordance with the Yosemite *Wilderness Management Plan*. These limits are based on the number of acres in a wilderness travel zone, the miles of trail it contains, and its ecological fragility. A computer simulation model compared actual use to desired use, resulting in the current trailhead quota system in effect parkwide.

- Visitors may enter Yosemite Valley until westbound traffic is backed up from Lower Yosemite Fall to Curry Village Four-Way intersection or all day-use parking spaces have been filled, and/or the 18,000 person capacity (per *General Management Plan*) has been reached.

This restriction on inbound traffic may be necessary to prevent a traffic gridlock and to ensure that emergency vehicles will have access to all parts of the Valley. The *General Management Plan* established a daily limit of 18,241 for valley visitation. Uncontrolled traffic leads to pedestrian accidents, vehicle conflicts, and severe damage to the resources from vehicles parked where they should not be parked, destruction of view sheds because of uncontrolled parking, etc.

Closures:

- Pursuant to 36 CFR 2.2 (e) the entire park is closed to viewing wildlife with artificial light.

- Slopes along the Merced River and oak woodlands that are fenced and/or signed as being restored are closed to visitors except for designated trails or boardwalks.

  The portion of the Main Fork of the Merced River between Stoneman Bridge and Sentinel Picnic Area is open to all non-motorized vessels designed specifically for carrying passengers within their structure upon water between the hours of 10:00 A.M. Pacific Standard Time or Pacific Daylight Time and 6:00 P.M. Pacific Standard Time or Pacific Daylight Time.

  The entire length of open water on the Main Fork of the Merced River will be closed to all floatation devices whenever the river gauge at the Sentinel Bridge reads 6.5 feet or higher and the combination of air and water temperature is less than 100 degrees Fahrenheit.

  The Superintendent has determined that management of the Main Fork of the Merced River must meet the needs of all park users; including but not limited to photographers, fishermen, and those wishing to see undisturbed sections of free flowing river. Partitioning the river and placing time constraints on certain activities can accommodate each of the user groups accommodated while providing for both visitors and resource protection. This action has been determined to not be a major shift in policy nor a significant change to previous regulatory efforts.

Fishing

Pursuant to 36 CFR §2.3

(a) State fishing law and/or regulations do not apply in the following areas:

- Merced River from Happy Isles footbridge downstream to Foresta Bridge in El Portal where the following apply:
  --Rainbow Trout – a limit of zero (catch and release only)
  --Brown Trout – a limit of five per day or a total of ten in possession
  --Only artificial lures or flies with barbless hooks may be used.

(d)(2) Possession or use of live or dead minnows or other bait fish, amphibian, non-preserved fish eggs or roe are not permitted in Yosemite National Park.

(d)(4) In accordance with federal statutory law, commercial fishing is not authorized in Yosemite National Park.

(d)(8) Fishing within 200 feet of the following swimming beaches, rafts or floats for water sports, or from motor road bridges is not permitted in Yosemite National Park

Best Management Practices for Maintenance, Park Operations, and Construction

The following Best Management Practices represent some of the ways natural and cultural resources are protected throughout the day-to-day operation of the park. In order to protect park resources—including the Outstandingly Remarkable Values of the Merced River corridor—these measures may be implemented throughout a variety of maintenance, park operations, and construction activities (for the purposes of this discussion, construction includes major repair and/or rehabilitation, demolition, deconstruction, reconstruction, restoration, etc.).

Specific tasks may include, but are not limited to, the following:

NATURAL RESOURCES

- Implement a natural resource protection program. Standard measures include construction scheduling, biological monitoring, erosion and sediment control, use of fencing or other means to protect sensitive resources adjacent to construction, removal of all food-related items or rubbish to bear-proof containers, topsoil salvage, and revegetation. This includes specific construction monitoring by resource specialists as well as treatment and reporting procedures.

Geology, Geohazards, and Soils

- Conduct geotechnical and soils investigations as warranted. Implement appropriate siting, design, and construction measures to avoid or minimize geohazards. Provide erosion and sediment control.
- Avoid placing new facilities and buildings within geologic hazards areas whenever practicable.

Hydrology, Water Quality, and Floodplains

- An emergency preparedness plan will be developed for any facilities within the 100-year floodplain.
- Site new buildings outside of the floodplain, and/or use building engineering solutions to remove the building footprint from the floodplain, or flood-proof the building where feasible.
- For new facilities, and to the extent practicable for existing facilities, implement stormwater management measures to reduce nonpoint source pollution discharge from roads, parking lots, and other impervious surfaces. This includes oil/sediment separators, street sweeping, infiltration beds, and use of permeable surfaces and vegetated or natural filters to trap or filter stormwater runoff.

- Use silt fences, sedimentation basins, etc. in construction areas to reduce erosion, surface scouring, and discharge to water bodies.

Wetlands
- Conduct wetland surveys as warranted.
- Site and design facilities/actions to avoid adverse effects to wetlands. If avoidance is infeasible, minimize and compensate adverse effects to wetlands in accordance with Executive Order 11990 (Protection of Wetlands), the Clean Water Act, and Director's Order #77-1.
- Delineate wetlands and apply protection measures during maintenance activity or construction. Wetlands will be delineated by qualified National Park Service staff or certified wetland specialists and clearly marked prior to construction work. Construction activities shall be performed in a cautious manner to prevent damage caused by equipment, erosion, siltation, etc.
- Develop and implement restoration and/or monitoring plans as warranted. Plans shall include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.

Vegetation
- Conduct vegetation surveys as warranted.
- Site and design facilities/actions to avoid adverse effects to sensitive vegetative communities and large trees. If avoidance is infeasible, minimize and compensate adverse effects to sensitive vegetation as appropriate.
- Use only native plants in landscaping. Existing annosus centers in developed areas could be mitigated by landscaping with species that are not susceptible to infection, such as California black oak, live oak, and big-leaf maple.
- Prepare and implement a noxious weed abatement program. This includes restoration of degraded habitats, use of hand labor to remove weeds, and use of herbicides. Standard measures include the following elements: during construction activities, ensure that construction-related equipment arrives to the site free of mud or seed-bearing material, certify all seeds and straw material as weed-free, identify areas of noxious weeds preconstruction, treat noxious weeds or noxious weed topsoil prior to construction (e.g., topsoil segregation, storage, herbicide treatment), and revegetate with appropriate native species.
- Develop and implement restoration and/or monitoring plans as warranted. Plans shall include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.
- Develop revegetation plans for areas disturbed during maintenance or construction and require the use of native species. Revegetation plans shall specify seed/plant source, seed/plant mixes, soil preparation, etc. Salvage vegetation shall be used to the extent possible.
- Comply with the *Vegetation Management Plan* for landscaping and yard care within and around developed areas, including minimization of irrigation systems and planting with native species.
- Implement a tree protection plan as warranted. This includes measures such as avoidance of the root-zone (typically 1.5 times the tree canopy), use of hand equipment for trenching within the root-zone, reduce compaction within root-zones, and maintain a natural grade.

Wildlife
- Conduct wildlife surveys as warranted.
- Implement measures to reduce bear/human encounters. Measures include visitor education on bear behavior; installation of bear-proof food storage lockers at campsites and bear-proof garbage receptacles in parking lots and other facilities as warranted; enforcement of park regulations; regular trash collection; and removal of apples from historic orchards.

- Implement measures to reduce adverse effects of non-native wildlife. This includes use of processed feeds and hay at stables to reduce food for cowbirds, trapping programs for cowbirds, and measures to eradicate bullfrogs from wetland habitats.
- Site and design facilities/actions to avoid adverse effects to sensitive wildlife habitats or habitat features, especially during breeding seasons. If avoidance is infeasible, minimize and compensate adverse effects as appropriate.
- Minimize night lighting where practicable. Where night lighting is necessary, design lighting to be minimal, directed downward, and shielded.
- Educate the public on the dangers of intentional or unintentional feeding of park wildlife and on inadvertent harassment through observation or pursuit.

General Special-Status Species Measures

The following general measures will be employed to avoid, minimize or compensate for adverse effects to special-status species.

- Avoid adverse effects to special-status species when practicable.
- Conduct surveys for rare, special-status species as warranted.
- Site and design facilities/actions to avoid adverse effects to special-status species. If avoidance is infeasible, minimize and compensate adverse effects to rare, threatened, and endangered species as appropriate and in consultation with the appropriate resource agencies.
- Develop and implement restoration and/or monitoring plans as warranted. Plans should include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.
- Implement measures to reduce adverse effects of non-native plants and wildlife on special-status species.
- Maintain or restore the presence of very large, old trees, snags, large diameter logs, and decaying wood across the landscape.
- Maintain conditions suitable for spotted owl prey base, including decadence features such as mistletoe brooms, cavities, tree deformities, fungus growth, and large, decadent oaks.
- Maintain and restore shading and desired water temperatures, water quality, root strength, input of large woody debris, and input of organic matter (including leaf litter) in riparian and aquatic areas.
- Maintain and restore functioning wet meadows within or adjacent to late successional forests.
- Maintain and restore watershed and hydrologic processes, including the role of mountain meadows.
- Maintain and restore riparian and aquatic vegetation structure and function.
- Maintain and restore connectivity of aquatic and riparian habitats.
- Maintain areas where species sensitive to human activity can successfully breed or feed without harassment.
- Implement adaptive management strategies as appropriate.

- Implement a fencing and flagging program to protect special-status species or sensitive habitats. This includes the following types of measures: use of high visibility snow fence about protected elderberry shrubs, marking trees to be retained, and use of signs (e.g., no refueling signs) in areas of high sensitivity.

Valley Elderberry Longhorn Beetle

- All National Park Service personnel that coordinate construction work in the gorge and El Portal shall be familiar with locations and avoidance requirements for all elderberry shrubs within the construction zone.
- The contractor and all of the contractor's on-site personnel shall be briefed on the locations of elderberry, avoidance requirements, and penalties for noncompliance.

- Elderberry plants within the project area shall be individually fenced 20 feet from the dripline. The area will be signed before clearing and grubbing begins and before any large equipment is allowed to access to the site.
- A qualified National Park Service staff member shall be present for the duration of the project to ensure no unnecessary take of elderberry occurs. The staff member will have the authority to stop all construction activities should the potential for unnecessary take become apparent. He or she shall report any violations to the U.S. Fish and Wildlife Service.
- Any construction-related disturbance to the buffer zone (100-feet from the dripline) shall be minimized and restored following construction.

Special-Status Birds

- To avoid conflicts with nesting birds, construction activities within nesting habitat could occur outside the breeding season (which typically is March to August).
- Trees or structures with unoccupied nests (stick nests or cavities) shall be removed prior to March 1, or following the nesting season.
- Alternatively, if activities take place during the breeding season, a qualified biologist will conduct a pre-construction survey for individuals no more than two weeks prior to construction in March through August. If any special-status species is observed nesting, a determination shall be made whether or not the proposed action will impact the active nest or disrupt reproductive behavior.
- If it is determined that the action will not impact an active nest or disrupt breeding behavior, construction will proceed without any restriction or mitigation measure.
- If it is determined that construction will impact an active nest or disrupt reproductive behavior then avoidance strategies should be implemented. Construction shall be delayed within 500 feet of such a nest until a qualified biologist determines that the subject birds are not nesting or until any juvenile birds are no longer using the nest as their primary day and night roost.

Special-Status Aquatic Species

Implementation of the following conservation and protection measures would reduce or eliminate potential taking of special status amphibians and aquatic species. These measures were abstracted from the U.S. Fish and Wildlife Service Programmatic Biological Opinion for projects that may affect California red-legged frog, though the Biological Opinion does not specifically apply to this project because no California redlegged frog take is anticipated. Provisions listed below are considered reasonable and prudent for actions located within 100 feet of aquatic habitats:

- Work activities within potential special status aquatic species habitat shall be completed between April 1 and November 1 or during low-flow conditions.
- A qualified biologist shall survey the site two weeks before the onset of activities. If special status aquatic species, tadpoles, or eggs are found, the biologist will contact the appropriate agency(ies) to determine if moving any of these life-stages is appropriate.
- A qualified biologist shall conduct training sessions for all construction personnel before activities begin.
- The aquatic construction boundary shall be fenced to prohibit the movement of frogs into or out of the construction area and to control siltation and disturbance to aquatic habitat.
- All construction adjacent to or within aquatic habitats shall be regularly monitored.
- All trash that may attract predators shall be contained and regularly removed. Following construction, all trash and construction debris will be removed from work areas.
- All fueling and maintenance of vehicles and equipment shall occur at least 20 meters (65 feet) from any aquatic habitat.
- The spread or introduction of invasive non-native plant species shall be avoided. When practicable, invasive non-native plants in the project areas will be removed.

- The number and size of access routes, staging areas, and total area of activity shall be limited to the minimum necessary to achieve the project goal.
- Best management practices shall be implemented to control erosion.
- During dewatering, intakes shall be completely screened with wire mesh not larger than five millimeters (mm) to prevent aquatic species from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that allows flow to resume with the least disturbance to the substrate.
- Where practicable, qualified biologists will permanently remove, from within the project area, any individuals of non-native species, such as bullfrogs, crayfish, and centrachid fishes, to the maximum extent possible.
- The downstream construction boundary shall be fenced to prohibit the movement of aquatic species into the construction area and to control creek siltation and disturbance to downstream riparian habitat. An exclosure fence shall be installed in the creek channel both upstream and downstream of construction activities as appropriate. Fences shall be installed at least six weeks prior to the commencement of any construction activities.
- Immediately after installation of the exclosure fence, a qualified biologist shall inspect all areas within the fence for aquatic species.

Special-Status Bats

- A qualified biologist shall conduct surveys to determine whether affected structures, mature trees, or other habitat (e.g., crevices) that would be affected by a proposed action, provide hibernacula or nursery colony roosting habitat.
- If surveys conducted during the fall do not reveal any bat species, then the action shall occur within three days in order to prevent the destruction of any bats that move into the area after the survey.
- If the site is being used as a winter roost, then the action shall occur either prior to (between September 1 and October 1) or after hibernation (January 15 to February 15).
- If spring surveys are conducted and reveal that the site is being used as a nursery colony, the action shall not occur until after August 15, when the pups are weaned and are volant.

Other Special-Status Mammals

- Excavation sites (trenches or pits) will have suitable ramps for all small mammals to exit these areas.
- A qualified biologist will be available to inspect all excavations before refilling occurs, ensuring that special-status species are passively relocated to avoid incidental take.
- Exclosure fencing can be erected prior to construction to ensure that no special-status species are within the construction area.
- Speed limits in primary fishery habitat shall be low to prevent accidental injury.

Air Quality

- Implement smoke management policies of the Fire Management Plan to reduce the potential for prescribed burning activities to have a major effect on air quality in the park or in the park vicinity.
- Site and design facilities to minimize objectionable odors.

Noise

- Implement standard noise abatement measures during park operations and construction. Standard noise abatement measures include the following elements: a schedule that minimizes impacts to adjacent noise-sensitive uses, use of the best available noise control techniques wherever feasible, use of hydraulically or electrically powered impact tools when feasible, and location of stationary noise sources as far from sensitive uses as possible.
- Site and design facilities to minimize objectionable noise elements.

CULTURAL RESOURCES

- Implement a cultural resource protection program. Standard measures include salvage of historic building materials, archeological monitoring during ground disturbing activities (in keeping with the 1999 Programmatic Agreement), use of fencing or other means to protect sensitive resources adjacent to construction, and preparation of a discovery plan to handle unanticipated exposure of buried human remains. This includes specific construction monitoring by resource specialists and culturally associated American Indian people, as well as treatment and reporting procedures.
- Implement a compliance-monitoring program in order to stay within the parameters of National Environmental Policy Act and National Historic Preservation Act compliance documents, U.S. Army Corps of Engineers Section 404 permits, etc. The compliance-monitoring program will oversee these mitigation measures and will include reporting protocols.
- Subject projects to site-specific planning and compliance in accordance with the park's 1999 Programmatic Agreement. Efforts will be made to avoid adverse impacts through use of the Secretary of the Interior's Standards for Archeology and Historic Preservation, and by using screening and/or sensitive design that would be compatible with historic resources.
- Site and design facilities/actions to avoid adverse effects to sensitive cultural resources. Subject projects to site-specific planning and compliance in accordance with the park's 1999 Programmatic Agreement. Conduct archeological site monitoring and routine protection. Conduct data recovery excavations at archeological sites threatened with destruction, where protection or site avoidance during design and construction is infeasible.
- Avoid or mitigate impacts to ethnographic resources. Mitigation could include identification of and assistance in accessing alternative resource gathering areas, continuing to provide access to traditional use and spiritual areas, and screening new development from traditional use areas.
- Restore and rehabilitate cultural landscape resources to the extent feasible. This could entail restoring important historic viewsheds through manual thinning, rehabilitating meadows and open spaces through prescribed burning, removing noncontributing and incompatible structures, and incorporating new additions using compatible design.
- Continue and formalize ongoing consultations with culturally associated American Indian people. Formalize a parkwide gathering plan and discovery plan for American Indian remains. Protect known burial sites, and protect sensitive traditional use areas to the extent feasible.
- Conduct surveys for archeological sites, traditional resources, historic sites, structures, and cultural landscape resources as warranted.

Sustainable Design and Aesthetics

- Projects shall avoid or minimize adverse impacts to natural and cultural resources.
- Development projects (e.g., buildings, facilities, utilities, roads, bridges, trails, etc.) or reconstruction projects (e.g., road reconstruction, building rehabilitation, utility upgrade, etc.) shall be designed to work in harmony with the surroundings, particularly in historic districts.
- Projects shall reduce, minimize, or eliminate air and water nonpoint source pollution.
- Projects shall be sustainable whenever practicable, by recycling and reusing materials, by minimizing materials, by minimizing energy consumption during the project, and by minimizing energy consumption throughout the lifespan of the project.

Scenic Resources

- Where appropriate, facilities such as boardwalks and fences shall be used to route people away from sensitive natural resources, while still permitting access to important viewpoints.
- Facilities shall be designed, sited, and constructed to avoid or minimize adverse effects on natural communities and visual intrusion into the natural landscape.

Park Operations

- Implement a traffic control plan, as warranted. Standard measures include strategies to maintain safe and efficient traffic flow during the period of road work.
- Implement a dust abatement program. Standard dust abatement measures include the following elements: water or otherwise stabilize soils, cover haul trucks, employ speed limits on unpaved roads, minimize vegetation clearing, and revegetate areas after construction.
- Implement a spill prevention and pollution control program for hazardous materials. Standard measures include hazardous materials storage and handling procedures; spill containment, cleanup, and reporting procedures; and limitation of refueling and other hazardous activities to upland/nonsensitive sites.
- Implement measures to reduce adverse effects of maintenance-related work or construction activities on visitor safety and experience.
- Implement a notification program. Standard measures include notification of sensitive receptors, utilities, and emergency response units prior to work activities.
- Implement an interpretation and education program. Continue directional signs and education programs to promote understanding among park visitors.

Chapter 3
Facilities-based Capacities

The amounts and types of visitor use in the Merced River corridor are determined, in part, by the available facilities. Overnight capacity is largely controlled by the number of campsites and lodging units, along with the numbers of parking spaces provided for people using the Valley to reach backcountry camping areas. Day visitor use is limited by the numbers of parking spaces and the capacity of the road system in the Valley.

The *General Management Plan* established maximum use levels for each developed area in the park, including Yosemite Valley and Wawona. The maximum daily use levels for developed areas in the Merced River Corridor are as follows:

LOCATION	VISITORS IN A 24-HOUR PERIOD
Yosemite Valley	18,241
Cascades/Arch Rock	360
El Portal	765
Wawona	3,311

The *Yosemite Valley Plan* and the implementation projects being undertaken by the park seek to manage visitation according to the levels called for in the *General Management Plan* (18,241) through the provision of appropriately sized and located visitor facilities that are designed to protect and enhance river-related Outstandingly Remarkable Values.

The *Yosemite Valley Plan* will achieve *General Management Plan* use levels and protect the Merced River corridor by reducing overnight facilities and relocating them away from the River Protection Overlay and other sensitive resource areas, thereby protecting Outstandingly Remarkable Values. The *Yosemite Valley Plan* also calls for consolidating day visitor parking in order to further protect the Outstandingly Remarkable Values by reducing the impacts from roadside parking and excess driving by visitors looking for parking at dispersed locations.

When the *Yosemite Valley Plan* is fully implemented, overnight visitation is expected to be 5,389 per day. The Yosemite Lodge Area Redevelopment and the Curry Village and East Yosemite Valley Campground Improvement projects begin the process of implementing the *Yosemite Valley Plan* by providing appropriately scaled and sited overnight lodging and camping facilities that will protect and enhance Outstandingly Remarkable Values. Both of these projects have been planned and designed through a comprehensive environmental compliance process that assures consistency with the Merced River Plan and the *Yosemite Valley Plan*.

When the *Yosemite Valley Plan* is fully implemented, day-use visitation is expected to be 12,852 people per day. Parking for day visitors will be provided at both in-Valley and out-of-Valley locations.

If the park seeks to change the size, use levels, and locations of facilities, the park will undertake appropriate environmental compliance processes as directed by the National Environmental Policy Act (NEPA). Environmental compliance pursuant to NEPA enables the park to 1) analyze the environmental

impacts of the facilities, including any impacts to the Outstandingly Remarkable Values of the Merced River, and 2) prescribe mitigation measures if necessary.

The size and location of these facilities cannot be changed without completing appropriate supplemental compliance. For example, the *Yosemite Valley Plan* analyzed the environmental impacts of a number of proposed facility changes. For some projects, however, site specific planning was not completed as part of the *Yosemite Valley Plan* and therefore not enough detail was known about a project to identify the full range of possible environmental impacts. In those instances—as with the Curry Village and East Yosemite Valley Campgrounds Improvements project—additional NEPA compliance is necessary. In the Curry Village area, the *Yosemite Valley Plan* identified the development footprint in which some reductions to lodging rooms and modest increases to campsites would occur to meet *Yosemite Valley* Plan approved visitor use levels. However, it did not present actual locations for these facility changes within the identified development footprint. This detailed level of planning was completed as part of a site-specific Environmental Analysis. It was through this subsequent NEPA process that the park further analyzed and documented benefits and impacts to the Merced River's Outstanding Remarkable Values.

Although administrative facilities and employee housing do not have a direct relationship to visitor use, there are capacity limits associated with these types of facilities. The size and location of facilities cannot be changed without completing appropriate supplemental compliance. For example, decisions regarding the relocation of employee housing and administrative facilities were presented in the *Yosemite Valley Plan*. Additional site-specific environmental compliance must be conducted to analyze the full range of impacts within the areas identified for new facilities. This planning effort, identified as the *Comprehensive Design Plan for El Portal Environmental Impact Statement*, is anticipated to begin in 2004. In El Portal, the type and extent of facilities is limited to the Park Operations and Administration zone (see Page 35) prescribed by the Merced River Plan. Any new facilities must be sited in accordance with this zoning prescription.

The daily visitor use levels indicated in the *General Management Plan* and *Yosemite Valley Plan* may be informed by the findings of the VERP program. As described in Chapter 6, Addressing User Capacity through the VERP Framework, the park will monitor an array of indicators and standards designed to achieve desired conditions. If monitoring were to indicate that desired conditions were not being met, the park would take management action. VERP is a tool that can assist the park in assessing the appropriateness of these daily use levels.

Utility Systems Capacities

In addition to limits set by the capacity of the park's facilities, use within the Merced River corridor is also limited by the capacity of the park's utility systems, namely the ability to collect and treat wastewater. The capacity of the Yosemite Valley and Wawona wastewater systems is limited by the permitted capacity of the wastewater treatment facilities in each area. Yosemite Valley and all of El Portal (along the main stem of the Merced River) are served by the El Portal Wastewater Treatment Plant. The Wawona area (along the South Fork of the Merced River) is served by the Wawona Wastewater Treatment Plant. The standards for wastewater collection and treatment are established through the federal Environmental Protection Agency. The State of California sets the capacity for each facility, which mandates the overall capacity through an issued permit (on file at each facility). In accordance with this permit, the park cannot design or build any facilities that will exceed the permitted capacity established for wastewater treatment. At the El Portal Wastewater Treatment Plant, the permit establishes a treatment capacity of 1 million gallons per day. At the Wawona Wastewater Treatment Plant, that capacity has been set at 0.105 million gallons per day.

The park is in the process of implementing improvements to utilities within the eastern portion of Yosemite Valley. This project, set forth in the East Yosemite Valley Utilities Improvement Plan, provides for improvements to address existing utility system deficiencies. In addition, many of the existing utility lines adversely affect the Outstandingly Remarkable Values of the Merced River by interrupting natural drainage patterns through the riparian and meadow areas adjacent to the river. The proposed project enhances Outstandingly Remarkable Values through consolidation of utility corridors that cross less sensitive environmental areas, and removal of utilities from many meadows, riparian, and riverbank areas identified for restoration in the *Yosemite Valley Plan*. Under this project, the overall capacity of Yosemite Valley's water and wastewater systems will remain unchanged.

Chapter 4
Addressing User Capacity in Wilderness

Approximately 51 of the 81 total miles of the Merced River corridor flow through areas of designated Wilderness. For three decades, visitor use has been studied and monitored as part of the park's Wilderness Management program. The following section presents monitoring methods that have been in place since before the Merced was designated a Wild and Scenic River. The scientific methods used in Yosemite's wilderness have long been held up as a model for wilderness management throughout the United States. Today, they serve as a template for the development of standards and indicators that work to protect and enhance the river's Outstandingly Remarkable Values.

Trailhead Quota System

The Wilderness Management Branch in Yosemite National Park was created in 1972 in response to an overwhelming increase in park wilderness visitation, which started in the late 1960s. Passage of the 1984 California Wilderness Act—designating almost 95% of Yosemite as Wilderness—further mandated the utmost protection of these wild lands.

The Wilderness Quota System was implemented in 1972 to address visitor use and its effect on the backcountry areas of Yosemite. A capacity was set for each backcountry area or "travel zone." Capacities were based on the number of acres in the zone, the number of miles of trails it contained, and its ecological fragility. Park scientists determined ecological fragility by looking at soils, micro-climate, and vegetation, and assigning them a score based on their ability to withstand or recover from human induced impacts and their rarity in terms of parkwide presence. To determine the maximum number of people to be permitted in each zone at one time, acres and miles of trails were multiplied by desired sociological campsite and trail densities. The values were then adjusted downward by an evaluation of how well the ecological resources within each zone could withstand use.

From 1972 until 1977, voluntary wilderness permits were issued to gain more information about where people went in the wilderness after leaving the trailhead. This permit information melded with actual encounter data collected by backcountry rangers in the field. Additional research was conducted by park scientists who assessed compliance with the permit system (i.e., how well visitors followed through with their itineraries set in their wilderness permit). The resulting knowledge allowed park management to comfortably set capacities based on a trailhead quota system.

The data was then applied to "QUOTA," a computer program developed in Yosemite which tested how various levels of use allowed at a trailhead would disperse in the wilderness. A trailhead quota system was inaugurated in the park in 1977. At this time, wilderness permits became mandatory for all overnight use. Today, failure to obtain a wilderness permit can result in a fine. The system was re-evaluated using sampling and visitor interviews every five to ten years for the next 15 years, and is currently monitored through tracking trailhead and zone use and field encounters to assure that established quota numbers continue to appropriately control use. All overnight visitors to the Yosemite wilderness are required to obtain a wilderness permit, and the number of permits issued is based on these quotas which have been adjusted over the last 25 years. Currently, a maximum of 1,485 people per day would be allowed to enter the wilderness if all 76 trailhead quotas were filled.

The trailhead quota system protects both the visitor experience and the park's natural and cultural resources by limiting and dispersing visitor use to provide a quality visit while not overusing or causing impacts to the land and its community of life. It also allows agency personnel to contact all overnight visitors to educate them about their responsibilities for protecting Yosemite's wilderness.

This program has been extremely well supported by both park management and wilderness users, and is often held up as an example of science-based and defendable management practices in wilderness management. Today, the park experiences over 98% compliance with the permit system, and most of those users who do not obtain permits do so because they are using one of the very remote trailheads that would require driving a long distance to get the permit. Wilderness use, when coupled with other management techniques such as campsite maintenance and a strong education program, seem to be well within acceptable limits for this ecosystem, allowing maximum freedom for the visitor while protecting resources appropriately. This conclusion is supported by the results of the 30 year campsite inventory and monitoring program.

This system protects and enhances the Outstandingly Remarkable Values within the Wilderness zones of the Merced River corridor. Scientific integrity and scenic values are protected by minimizing human-caused change. Outstanding opportunities for solitude—one of the key components of the recreation Outstandingly Remarkable Value—are maintained by limiting and dispersing use. Biological and cultural Outstandingly Remarkable Values are protected by the Leave No Trace education visitors receive as part of the permit process and by limiting numbers of users. Water quality is protected both by limiting numbers and the educational process. All of the Outstandingly Remarkable Values (including hydrologic processes and geologic processes) are further protected by the dictates of the Merced River Plan (especially the Category 1 zoning and the wild classifications) and the Wilderness Act, which prohibit incompatible uses and virtually all types of development.

Yosemite Wilderness Trailhead Quotas

ENTRY/EXIT TRAILHEAD	QUOTA
WAWONA Mariposa Grove (winter only)	No quota in winter
Chiquito Pass	35
Chilnualna Falls	40
Alder Creek	25
Alder Creek (Wawona Road)	25
GLACIER POINT ROAD Badger Pass (winter only)	No quota in winter
Deer Camp Road	25
Westfall Meadow	10
Bridalveil Campground	25
McGurk Meadow	15
Lost Bear Meadow/Ostrander	25
Mono Meadow	20
Pohono from Glacier Point	15
Pohono from Taft Point Trail	10
Glacier Point to Illilouette	30
YOSEMITE VALLEY Rockslides trail (cross-country only)	10
Old Big Oak Flat	10
Pohono from Wawona Tunnel	10
Glacier Point to Little Yosemite Valley	10
Four Mile Trail (no camping)	10
Happy Isles to Illilouette	10
Happy Isles to Little Yosemite Valley	30
Happy Isles to Sunrise Creek OR Merced Lake (pass through Little Yosemite Valley)	10
Mirror Lake/Snow Creek	25
Yosemite Falls	25

TIOGA ROAD CORRIDOR Crane Flat (winter only)	No quota in winter
Merced Grove (no camping)	
Tamarack Creek/Old Big Oak Flat Road	25
South Fork Tuolumne River	25
White Wolf to Aspen Valley	25
White Wolf to Smith Meadow (including Harden Lake)	25
White Wolf to Pate Valley/Grand Canyon	30
White Wolf Campground	10
Lukens to Yosemite Creek	10
Lukens to Lukens Lake	10
Yosemite Creek	25
Ten Lakes	40
Porcupine Creek	25
May Lake	25
Snow Creek	10
Olmsted Point	10
TUOLUMNE MEADOWS Sunrise Lake/Clouds Rest	20
Murphy Creek	15
Cathedral Lakes	25
Budd Lake (cross-country only)	5
Elizabeth Lake/Nelson Lake	15
Rafferty Creek	35
Lyell Canyon	40
Glen Aulin	35
Cold Canyon/Waterwheel Falls (pass through Glen Aulin)	15
Young Lakes via Dog Lake	20
Young Lakes via Glen Aulin	10
Gaylor Creek	
Mono Pass/Parker Pass (no camping in YOSE)	15
Gaylor Lakes (no camping)	
Mt. Dana (no camping)	
Tioga Pass (winter only)	No quota in winter
MATHER & HETCH HETCHY Aspen Valley Road	10
Base Line Camp Road	25
Trail from Mather	25
Mather Ranger Station	25
Cottonwood Creek	15
Poopenaut Valley	25
Rancheria Falls	35
Beehive Meadows (Vernon)	35
Miguel Meadows	15
Lake Eleanor (through Cherry Lake)	25
CHERRY LAKE (by USFS permit; Groveland office) Kibbie Creek	25
Kibbie Ridge	25

Wilderness Impacts Monitoring System (WIMS)

The Wilderness Impacts Monitoring System (WIMS) is based on over 30 years of monitoring campsite and trail conditions in Yosemite's backcountry and wilderness. Three wilderness-wide inventory and monitoring studies have been completed which focused on campsite and trail impacts. The first two studies (Holmes[3] in the 1970s and WIMS 1 in the 1980s) inventoried and monitored every campsite and every foot of trail parkwide. The third, WIMS 2 which was completed in the 1990s, inventoried and monitored a subset of those thousands of sites and developed comparison data to determine when, where and why significant change occurs, and provided a system to track that change. It also gave wilderness managers a system to help understand the relationship of natural conditions, visitor experience, and wilderness resource management. WIMS 3 is underway and will be valuable in assessing the same sorts of changes during this first decade of 2000.

Sites exist in the Merced River drainage in all the studies, and can be used to track the health of these use areas and the effectiveness of the quota system in preventing human caused change. WIMS allows the park to protect Outstandingly Remarkable Values by actively monitoring threats to water quality, vegetation, and soils, along with the quality of the visitor experience (which is tied to the condition of campsites and trails). WIMS also assists the park by providing a long-term base of information, allowing the park to assess the effectiveness of our management actions which can then be extrapolated to protecting other Outstandingly Remarkable Values such as cultural resources.

[3] 1972 Holmes, D.O. Yosemite backcountry inventory, summer 1972. USDI, National Park Service, Yosemite National Park, CA. Final Report. 2295p.

Chapter 5
Addressing User Capacity through Management Zoning

Management zoning is a technique required by National Park Service policy to classify park areas and prescribe future desired resource conditions, visitor activities, and facilities. Similar to zoning found in other types of land-use planning (such as municipal zoning), management zoning prescribes future desired conditions for a particular area. A management zone is defined by the National Park Service's Visitor Experience and Resource Protection (VERP) framework as:

> *A geographical area for which management directions or prescriptions have been developed to determine what can and cannot occur in terms of resource management, visitor use, access, facilities or development, and park operations. Each zone has a unique combination of resource and social conditions, and a consistent management prescription. Different actions will be taken by the National Park Service in different zones with regard to the type and levels of use and facilities.*

The management zoning presented in this report was developed for and adopted by the *Merced Wild and Scenic River Comprehensive Management Plan*. The zones were developed to protect and enhance the Outstandingly Remarkable Values within each segment of the river. Specifically, the Merced River Plan places an emphasis on integrating protection and enhancement of natural and cultural resources identified as Outstandingly Remarkable Values with the protection and enhancement of the diverse recreation identified as Outstandingly Remarkable Values.

In order to protect the spectrum of recreational opportunities and resources, management zoning allows for visitor access and use of facilities in more resilient locations, as well as different intensities of use along the corridor. Zoning is consistent with National Park Service requirements and with the provisions of the Wild and Scenic Rivers Act, which states, "Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area."

Management Zones for the Merced River Corridor

The management zones for the Merced River corridor fall into three general categories: (1) Wilderness zones, (2) Diverse Visitor Experience zones, and (3) Developed zones. Within each of these three categories, there are individual subzones that provide for certain levels and types of visitor experiences, resource conditions, facilities, and uses.

The management zones are organized along a continuum of allowed impact intensity. Wilderness zones generally prescribe the least amount and intensity of visitor use and facility development, leaving the landscape mostly natural and protecting the values reflected in the wilderness segment Outstandingly Remarkable Values. Diverse Visitor Experience zones allow for a low to high range of visitor use and low to moderate range of facility development. While emphasizing protection and enhancement of natural and cultural resource-related Outstandingly Remarkable Values, they provide the diverse recreational opportunities also identified as Outstandingly Remarkable Values. Developed zones occur in limited areas in Scenic and Recreational segments. These zones allow for the most intensive visitor use and/or more developed facilities. The developed areas encourage concentration of higher-impact activities in areas better able to withstand heavy use or at locations that are already developed, enabling better protection of Outstandingly Remarkable Values in other areas.

Each zone prescribes the maximum level of activities and facilities. In practice, lower levels of visitor use and facilities may be provided than are described in the zoning prescriptions. For example, areas zoned for overnight lodging may be used for less-developed activities such as walk-in camping or could include protected natural areas. The management zones, delineated on the zoning maps allow future managers to direct development within the management zone. Within a given management zone, there may be some areas used for higher-intensity facilities or activities, while other areas within the same management zone are left natural and open. Management zoning provides overall guidance for decision-making over the long term. Zoning does not attempt to predict or prescribe every conceivable use or facility decision

Category 1: Wilderness Zones

Approximately 34 miles of the main stem and 19 miles of the South Fork of the Merced Wild and Scenic River corridors flow through designated Wilderness and are managed under the guidance and requirements of the 1964 Wilderness Act and the California Wilderness Act of 1984. As such, these segments will continue to be managed to preserve an environment in which the natural world, along with the processes and events that shape it, are largely unchanged by human use, and to allow for various forms of exploration in an environment primarily free of modification. Access limits are imposed to control human-induced change, and management actions such as education, regulation, and restoration will occur as appropriate to protect natural and cultural resources and designated Outstandingly Remarkable Values. Visitor use and enjoyment is encouraged as long as such use does not result in levels of human impact that compromise wilderness and river values. Visitors will encounter a variety of opportunities for solitude, primitive and unconfined recreation, and physical challenge. Presence of park staff will be limited, focused on locations of heavy use such as camping areas.

The Wilderness zones will be managed to protect the natural hydrologic and ecologic processes of the Merced River and its immediate environment. Other than trails and designated overnight areas, the Wilderness zones will exhibit natural conditions, with high-quality riparian, meadow, and aquatic habitats. There will be high native plant and animal species diversity and relatively minimal disturbance and human impact. The Merced River will remain free of impoundments, and natural processes, such as deposits of woody debris into the river, will occur without human interference. Water quality in the area will be very high.

The Wilderness zones emphasize the protection of natural resource Outstandingly Remarkable Values, such as biological, geologic, and hydrologic values. By limiting use and development, the Wilderness zones also protect and enhance cultural, scenic, and recreational Outstandingly Remarkable Values, which identify spectacular views, prehistoric sites, and opportunities for solitude and primitive recreation among the important values of the wilderness segments of the Merced River corridor.

Zone 1A. Untrailed

The Untrailed zone is primarily free of signs of modern human presence, with extremely high opportunity for solitude due to the remoteness of the area and lack of trails. Management activities in this zone will be minimal, allowing resources and natural processes to exist in their most pristine state. The Untrailed zone will be managed with very low tolerance for resource degradation from visitor use, and management action can be taken to change visitor use patterns if such degradation occurs.

Visitor experience is primarily based on hiking through often difficult terrain. There are no formal trails or directional markers in this zone. There are few, if any, human encounters, and wilderness skills and

knowledge are necessary to safely navigate these areas. Natural and cultural resources can be observed, but there are no formal interpretation or visitor accommodations. This area will provide substantial opportunities for scientific study of natural processes in undisturbed conditions.
The difficulty of access characterized by the Untrailed zone serves to limit visitor use, thereby protecting and enhancing biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values. Opportunities for solitude, primitive and unconfined recreation, and enjoyment of natural river sounds are among the recreational Outstandingly Remarkable Values prominent in this zone.

Zone 1B. Trailed Travel

The Trailed Travel zone is characterized by light to moderate use focused on marked and maintained trails. Opportunities for solitude will range from moderate to high. There will be some management presence to accommodate resource protection and visitor use. The Trailed Travel zone will be managed with very low tolerance for resource degradation from visitor use, and management action can be taken to change visitor use patterns if such degradation occurred.

Most visitors will experience this area by hiking, although a small percentage of visitors traditionally use pack animals and can continue to do so. Visitor encounters will be infrequent, except in areas common for campsites and at key trail junctions. While there will be opportunities for challenge and adventure, the well-marked and maintained trails will allow visitors with a diversity of hiking abilities to experience the wilderness.

Through limitations on development and access, the Trailed Travel zone will protect and enhance biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values. Opportunities for solitude, primitive and unconfined recreation, and enjoyment of natural river sounds are among the recreational Outstandingly Remarkable Values prominent in this zone.

Zone 1C. Heavy Use Trail

The Heavy Use Trail zone is characterized by high levels of use on marked and maintained trails and associated areas. Due to high use levels, opportunities for solitude at peak times will be more limited on trails in this area. In some locations, sections of paved or rocked trails and fencing can be used to direct visitor use away from sensitive ecosystems. The Heavy Use Trail zone will be managed with a low tolerance for resource degradation due to visitor use, and management action can be taken to redirect use if such degradation occurred.

Most visitors will experience this area by hiking, although a small percentage of visitors traditionally use pack animals and can continue to do so. Encounters with other visitors can be frequent during certain periods of the day or at key trail junctions, vistas, and other high use locations. The well-marked and maintained trails will allow for visitors with a diversity of hiking abilities to experience the wilderness.

Through limitations on development, the Heavy Use Trail zone will protect and enhance biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values. While opportunities for solitude will be lower than in the less-traveled Untrailed and Trailed Travel zones, this zone will provide ready access to wilderness hiking and backpacking near the Merced River.

Zone 1D. Designated Overnight

The Designated Overnight zone is characterized by the heaviest overnight use of all areas of the Wilderness zones. Designated overnight areas will be centered at destination locations with facilities for resource protection and visitor use, specifically at the Little Yosemite Valley Campground, Moraine Dome Campground, Merced Lake Campground, and the Merced Lake High Sierra Camp (a potential Wilderness addition). Opportunities for solitude will range from low to moderate, depending on the season. Social interaction will be common. Presence of National Park Service staff will be moderate to

high in order to prevent or mitigate most adverse impacts. The Designated Overnight zone will be managed with a low tolerance for resource degradation due to visitor use. Facilities such as signs and fencing can be used to prevent unacceptable impacts. Campsites will be located away from any sensitive natural or cultural areas, including meadows, streams, lakes, and historic and archeological sites, to minimize impacts.

Most visitors will experience this area by hiking and/or staying overnight. Small percentages use pack animals and can continue to do so. Visitor encounters with others will be frequent during much of the hiking seasons. The well-marked trails and facilities will allow for a diversity of users to experience the wilderness.

The Designated Overnight zone concentrates visitor facilities in a localized area, allowing for higher protection and enhancement of biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values outside this zone. This zone also ensures that historic structures such as the High Sierra Camp can remain for continued use or for interpretive purposes. Signs, fencing, and other features can be used to direct visitors away from sensitive biological and cultural Outstandingly Remarkable Values, as necessary.

Category 2: Diverse Visitor Experience Zones

The Merced River corridor serves as an important recreational resource, providing opportunities for nature study, hiking, picnicking, swimming, fishing, and other activities for many of the nearly 4 million people who visit Yosemite National Park each year. The Merced River corridor also serves as a continuous visual element of the landscape, setting off significant features such as waterfalls, granite domes, and peaks.

Natural resource management in these zones will strive to protect and enhance the natural functioning of ecological and hydrological systems while accommodating moderate levels of visitor use. The Category 2 zones are designed to protect and enhance biological, hydrologic, geologic, scenic, cultural, and scientific Outstandingly Remarkable Values, as well as the recreational Outstandingly Remarkable Values. This will be achieved by maintaining, wherever possible, the integrity of an overall ecological unit (such as a meadow, woodland, or wetland), while allowing for some human alteration of the landscape. Riparian, aquatic, and meadow communities in the river corridor play a particularly critical role in a variety of ecosystem processes and also contribute to the cultural landscape. Restoration of the ecological and hydrological systems in these areas will focus on enhancing the diversity and stability of natural functions. Resource degradation will be minimized by the careful design and siting of facilities that direct visitor and administrative activities to locations able to withstand heavy use. Monitoring of visitor impacts on natural and cultural resources will help ensure adaptive and timely management responses to potential resource degradation.

The Diverse Visitor Experience zones will be managed to protect and enhance the hydrologic and ecologic processes of the Merced River and its immediate environment. Riparian areas and meadows shall remain largely intact, supporting a diversity of native vegetation and wildlife species. However, localized areas can be developed with trails, roads, and parking areas and a greater amount of resource protection features (e.g., fencing and boardwalks) to allow for visitor access. Higher levels of resource impacts, such as trampling and soil erosion, and a greater amount of resource protection features might be expected in limited areas within the Day Use and Attraction zones to accommodate high numbers of visitors. The free flow of the river will remain primarily unimpeded. Water quality in the area shall be high.

The Diverse Visitor Experience zones protect cultural Outstandingly Remarkable Values, such as historic structures and prehistoric sites, by directing visitor access to areas able to withstand heavy use.

Restoration of natural features such as wetlands and meadows will also restore the cultural landscape. Interpretation of historic resources is allowed in these zones to provide visitor education opportunities.

The Category 2 zones also protect and enhance recreational Outstandingly Remarkable Values, which emphasize the value of providing diverse recreational opportunities for visitors. The lower-intensity zones – Open Space and Discovery – provide opportunities for quiet enjoyment of the river corridor, while the Day Use and Attraction zones accommodate higher levels of use at park destinations.

2A. Open Space

The Open Space zone is characterized by relatively undisturbed natural areas that receive only incidental or casual use. Maintenance of these conditions will allow for the protection and enhancement of the biological, hydrologic, scenic, cultural, and scientific Outstandingly Remarkable Values while providing access to diverse visitor activities.

The visitor experience in this zone will be self-directed, with few visitor or management encounters, which will contribute to the diversity of experiences specified in the recreation Outstandingly Remarkable Value. The Open Space zone will be managed with very low tolerance for resource degradation from visitor use to protect and enhance biological, hydrologic, scenic, cultural, and scientific Outstandingly Remarkable Values. Visitation levels may be controlled by parking limitations and by the lack of shuttle bus stops. These limits on use and facilities will allow natural areas to remain relatively unimpaired and to receive continued protection, restoration, and enhancement.

There will be limited trails and interpretive facilities. These will direct visitors away from hazardous areas and sensitive Outstandingly Remarkable Values, such as unique wetlands, and promote understanding of natural processes. These areas will generally be quiet with limited facilities. The areas can be relatively easy to access or require considerable walking and skill to access. Though not directly accessible by vehicles or from parking areas, noise from nearby vehicles could affect visitor experiences in this zone.

Resource protection activities in this zone will include preservation of cultural resources and restoration of natural processes impacted by contemporary development, restoration of natural flood cycles and river channel dynamics to sustain native plant and wildlife species, and use of fire management practices called for in the Fire Management Plan to enhance biological and hydrologic Outstandingly Remarkable Values. This zone also encourages the protection and enhancement of cultural resource Outstandingly Remarkable Values, including archeological sites, by limiting development and access. Restoration of natural resources such as wetlands and meadows will also contribute to the restoration of the cultural landscape.

2A+. Undeveloped Open Space

The Undeveloped Open Space zone is managed as de facto wilderness, primarily free from signs of human presence due to its inaccessibility. This zone will be used to protect those areas outside designated Wilderness that have limited or no trail access, such as the area west of the Wawona Campground along the South Fork. While Undeveloped Open Space areas will remain in pristine condition, visitors can experience some human influence due to noise from nearby roads. Typical activities include hiking, rock climbing, swimming, nature study, and fishing. Access will require considerable effort because of lack of trails.

This zone will be managed in a similar manner as the Untrailed zone (1A) by protecting and enhancing biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values through limitations on development and access.

2B. Discovery

The Discovery zone is characterized by relatively quiet natural areas where visitor encounters are low to moderate, which will contribute to the diversity of experiences specified in the recreation Outstandingly Remarkable Value. However, during high-use periods, some concentrated use and more frequent visitor encounters can occur on trails that link destination points through the Discovery zone. The Discovery zone will be managed with low tolerance for resource degradation from visitor use, emphasizing the protection and enhancement of biological, hydrologic, scenic, cultural, and scientific Outstandingly Remarkable Values. The zone also emphasizes low-intensity visitor uses, which contribute to the spectrum of river-related activities specified in the recreation Outstandingly Remarkable Values. Limits on use and facilities will allow natural areas to remain relatively unimpaired, when they are not close to one of the few access roads. There will likely be trail access and interpretive signs at principal features and gathering areas, but the visitor experience would be largely self-directed. Areas in the Discovery zone can be used by individuals or smaller, organized groups. Access to these areas can require a moderate level of physical exertion, although some locations would be served by an access road and parking turnouts.

Within the Discovery zone, visitors will likely experience a variety of resources, including distant and close-range scenic views as well as opportunities to wade, swim, or fish in the river and to observe wildlife and plants. If use levels began to show an impact on resources, resource protection measures can be used, such as fencing and signs to direct travel from sensitive resources, well-marked trails and boardwalks, recycling and trash containers, relocation of shuttle bus stops in this or adjacent zones, or other measures as needed.

Resource protection activities in this zone include restoration of natural processes affected by past or current human use, restoration of natural flood cycles and river channel dynamics to sustain native plant and wildlife species, and use of fire management practices called for in the Fire Management Plan to enhance biological and hydrologic Outstandingly Remarkable Values. This zone also encourages the protection and enhancement of cultural resource Outstandingly Remarkable Values, including archeological sites, by limiting development and access. Restoration of natural resources such as wetlands and meadows also contribute to the restoration of the cultural landscape.

2C. Day Use

The Day Use zone is intended to be applied to popular park destinations, where visitors could spend significant periods of time enjoying the park resources in a relatively accessible setting. The Day Use zone enhances opportunities for visitors to enjoy more intensive recreational activities near the Merced River and supports a range of active recreational opportunities such as swimming, picnicking, and rafting, which contributes to the diversity of experiences specified in the recreation Outstandingly Remarkable Value. Visitors can expect moderate to high numbers of encounters with other park users and crowding on certain peak days. Large groups can use these areas. Day Use areas may be accessible by automobile, shuttle bus, and by bicycle, with interpretive trails or other marked trails leading to waterfalls, beaches, and scenic views. In order to accommodate heavier and more concentrated activity, facilities such as parking areas, restrooms, fencing of sensitive areas, picnic tables, and recycling and trash receptacles are allowed.

Resource protection activities in this zone are comparable to those described in zones 2A and 2B. However, due to the larger volume of visitors, the Day Use zone will be managed with moderate tolerance for resource degradation from visitor use in specified areas. To protect and enhance cultural, biological, and hydrologic processes Outstandingly Remarkable Values, more extensive resource protection measures may be needed to direct visitor use away from sensitive resources. Examples include boardwalks adjacent to meadows or fencing to prevent trampling and overuse. By encouraging

higher visitor use in the Day Use zone, adjacent Open Space and Discovery zones will experience the desired lower visitor use for these areas. Some Day Use areas also protect historic resources, such as continued use of the Wawona Golf Course.

2D. Attraction

The Attraction zone is applied to main park features that attract large numbers of visitors, such as viewing areas for Bridalveil Fall. Due to the high number of visitors, this zone will be managed with moderate tolerance for resource degradation in specified areas, not to exceed established standards. The visitor experience in this zone will be highly structured, with well-marked and often paved trails or other trails to guide visitors, which will contribute to the diversity of experiences specified in the recreation Outstandingly Remarkable Value. Visitors can expect a high level of encounters with other visitors in these moderately to very busy areas. Attraction areas can be accessible by automobile, shuttle bus, bicycle, and/or trail.

To accommodate high visitor use, substantial facilities such as restrooms, parking lots, bus access and parking, and picnic tables can be provided at the entry point of the attraction area or another appropriate site. Facilities will be concentrated within the attraction area to minimize the extent of development and impacts. As a result, many areas within an Attraction zone will have a well-used trail, but minimal developed uses away from the entry "hub" or access point. Trails can be paved, fenced, and well-signed to reduce potential resource impacts. Visitor use in sensitive areas will be formalized and concentrated to avoid resource damage.

By encouraging higher visitor use in the Attraction zone, adjacent Open Space and Discovery zones will experience the desired lower visitor use for these areas. This zone also will ensure that visitors have the opportunity to enjoy the park’s most popular features, some of which are designated scenic, recreational, or cultural Outstandingly Remarkable Values (e.g., views of granite domes, Wawona Covered Bridge).

Category 3: Developed Zones

Carefully designed and located facilities are needed to meet the diverse needs of the many people who visit Yosemite National Park each year. The use of limited Developed zones provides sites for the facilities that enable the park to support its year-round visitor and employee populations and serve the needs of visitors. These include lodging, utilities, housing, and transportation facilities. Most of the Developed zones are located in areas that are currently, or that were previously, altered by development.

The purpose of the Developed zones is to direct high-impact activities and facilities to areas better able to withstand heavy use and/or already developed locations in order to further protect and enhance the hydrologic, biological, geologic, cultural, scenic, scientific, and recreation Outstandingly Remarkable Values in other parts of the corridor. The facilities allowed for in the Developed zones, such as campsites, lodging, day-visitor parking, operational facilities, and utilities are necessary to properly accommodate park visitors, many of whom are coming to experience the scenic, recreational, and other Outstandingly Remarkable Values of the Merced Wild and Scenic River.

While these zones can absorb the most concentrated visitor and administrative use, resource impacts will be minimized through design and siting of facilities, and the application of mitigation and restoration measures. These measures can include temporary or permanent fencing to reduce or exclude use in sensitive resource areas, revegetation with native species, and/or the prevention of the establishment of non-native species. Visitor use will be managed to reduce the potential impacts of concentrated use.

Higher levels of resource impacts (e.g., through the development of parking and other facilities) will be tolerated in specified areas within the Developed zones. In development areas, with more users and types of uses, there will be more site hardening and other management actions in order to maintain riparian areas, meadows, archeological sites, and other resources. While high-quality riparian habitat and

meadows are not found in the Developed zones, use in these zones will be managed to prevent degradation or interference with the natural functions of adjacent zones. The free flow of the river will remain primarily unimpeded, with the exception of existing development such as historic bridges in Yosemite Valley and riprap along the El Portal Road.

3A. Camping

The Camping zone provides visitors with opportunities for both vehicle-access (including drive-to) camping and walk-in camping. Drive-to camping areas will include campsites with adjacent parking, providing convenient access to various facilities. Support facilities such as picnic tables and restrooms will be provided at camping areas. The Camping zone primarily supports the recreational Outstandingly Remarkable Values by ensuring access to diverse recreational activities near the Merced River. Most areas designated as Camping zones have been previously developed, including historic resources such as Camp 4, which will be preserved under this zone. By concentrating relatively high-impact development to localized areas, this zone helps to protect and enhance natural and cultural resource Outstandingly Remarkable Values in the zone as a whole and in other parts of the river corridor.

Walk-in camping will provide an opportunity for visitors to camp away from vehicles, but retain access to facilities such as restrooms, water, and picnic tables. Campsites will be accessed by relatively short and well-marked trails with directional and informational signs. In walk-in camping areas, visitors will have the opportunity to engage more directly with the natural environment of the Merced River corridor without the visual impacts of entry roads, parking lots, vehicles, or other major facilities.

While the Camping zone allows for both drive-to and walk-in camping, the less-intensive walk-in camping will be directed to more sensitive areas (e.g., North Pines), while drive-to camping will be directed to areas better able to withstand heavy use (e.g., Upper Pines). In both drive-to and walk-in camping areas, visitor encounters will be moderate to high in the relatively dense clusters of campsites. The Camping zone will be managed with moderate to high tolerance for resource impacts in localized areas. While a certain level of hardening for parking sites and trampling by campers is expected, use will be directed away from sensitive areas. River access will be provided via marked and potentially hardened trails to direct visitors to areas better able to withstand heavy use, such as annually (or regularly) flooded gravel bars.

3B. Visitor Base and Lodging

The Visitor Base and Lodging zone includes areas developed for visitor overnight use as well as support facilities and services such as orientation facilities, eating establishments, gift shops, and equipment rental. Most areas designated as Visitor Base and Lodging zones have been previously developed, including historic resources such as The Ahwahnee, Wawona Hotel, and LeConte Memorial Lodge, which will be preserved under this zone. The visitor can expect a bustling atmosphere in these areas, with high incidence of visitor encounters during peak-use times. Facilities and lodging areas will be easily accessible by shuttle bus, automobile, trail, and bicycle.

With its relatively intense level of development, a higher degree of resource impacts may be tolerated in localized areas within the Visitor Base and Lodging zone. Future projects in this zone will be designed to minimize the footprint of developed areas and to protect and restore adjacent natural and cultural resources. River access will be provided via marked and potentially hardened trails to direct visitors to areas most able to withstand heavy use, such as annually (or regularly) flooded gravel bars. Structures such as fences, boardwalks, or walls can be provided to reduce impacts on riparian areas from casual river access generated by nearby lodging facilities.

The Visitor Base and Lodging zone primarily supports recreational Outstandingly Remarkable Values by providing for visitor uses facilitated by development such as visitor centers, museums, and lodging, which enable visitors to access the park and learn about its natural and cultural resources. Additionally,

by concentrating relatively high-impact development to localized areas, this zone will help to protect and enhance natural and cultural resource Outstandingly Remarkable Values in the zone as a whole and in other parts of the river corridor.

3C. Park Operations and Administration

The limited use of the Park Operations and Administration zone provides locations for facilities that support the efficient functioning of the park. Many areas designated as 3C have been previously developed, including historic resources such as the Chapel in Yosemite Valley, which will be preserved under this zone. The Park Operations and Administration zone will also provide opportunities for the management of private vehicles and public transit in the park, as well as interpretive centers that help visitors learn about the park's natural and cultural resources. Visitor use and experience of these zones will be limited. These areas will likely be relatively busy, with heavy impacts from vehicles and will be managed with a high tolerance for resource impacts in localized areas. New facilities will use sustainable design and construction principles to protect adjacent natural and cultural resources and would be subject to the criteria and considerations.

The Park Operations and Administration zone will protect and enhance the recreational Outstandingly Remarkable Value of the Merced River by providing space for necessary park operations as well as for day-visitor parking. At the same time, centralized operations (including facilities and utilities) make it possible to keep development out of more sensitive segments and zones, thereby protecting those areas from possible impacts to their Outstandingly Remarkable Values.

River Protection Overlay

The River Protection Overlay[4] is intended to apply the requirements of the Wild and Scenic Rivers Act, including the protection and enhancement of the Outstandingly Remarkable Values and the preservation of the free-flowing condition of the river, at a higher standard than that of the underlying management zones.

The areas immediately adjacent to the river channel, along with the river channel itself, are particularly important to the health and proper functioning of the river ecosystem. These areas allow for the main channel to link with backwater areas, tributaries, and groundwater systems; provide for increased channel diversity; and contribute sources of needed nutrients and woody debris to the river. In most circumstances, trees or other large woody debris falling into the river are recognized as part of the natural processes and will be left in the river to aid in the recovery of aquatic and riparian habitat. Additionally, the areas immediately adjacent to the river channel can help protect surrounding development from potential flood damage and can be used to filter runoff water draining into the river.

To ensure that the river channel itself and the areas immediately adjacent to the river are protected, the Merced River Plan includes a management tool called the River Protection Overlay. It is intended as a primary mechanism to achieve the goals of the Merced River Plan. The River Protection Overlay is also intended to identify the location of highest priority for restoration of hydrologic processes and biotic habitats within the river corridor. This critical zone would provide a buffer area for natural flood flows, channel formation, riparian vegetation, and wildlife habitat and would protect riverbanks from human-caused impacts and associated erosion.

---

[4] National Park Service staff developed the technical framework for the River Protection Overlay in a series of internal workshops beginning in 1993 and continuing into 1999. Staff reviewed technical studies by various agencies, including the U.S. Forest Service and the U.S. Fish and Wildlife Service. Many of these studies confirmed the importance of ensuring the contribution of inputs to the river from upland vegetation as a guide for setting the width of riparian protection areas.

Rivers are dynamic systems. As the movement of the river channel shifts over time, so would the specific areas included within the River Protection Overlay. Regardless of the location of the water's edge on any given day throughout the year, the River Protection Overlay is measured from the ordinary high water mark, as defined by the Army Corps of Engineers in 33 CFR Section 328.3:

> The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

The width of the River Protection Overlay is determined by site topography and vegetation and includes the area needed to encompass riparian and adjacent upland vegetation and habitat. In areas above 3,800 feet, the River Protection Overlay includes the river channel itself and extends 150 feet on both sides of the river measured from the ordinary high water mark; and in areas below 3,800 feet includes 100 feet on both sides of the river measured from the ordinary high water mark. (On the main stem of the Merced River, the 3,800-foot elevation point occurs near the Cascades Powerhouse. On the South Fork, the 3,800-foot elevation point occurs approximately one mile downstream of Squirrel Creek.) Generally, a wider band is required along the river in the flatter, open valleys, while a narrower buffer provides adequate protection in the steeper, V-shaped river gorges of the lower elevations (see figure 3). This transition occurs approximately at the 3,800-foot elevation mark, in the gorge area below Yosemite Valley on the main stem of the Merced River, and downstream of Wawona on the South Fork. Approximately 70 miles of the river has a 150-foot River Protection Overlay, including Yosemite Valley and Wawona. Approximately 11 miles of the river has a 100-foot River Protection Overlay, including the El Portal Administrative Site.

Projects occurring within the bed or banks of the river and that affect the free-flowing condition of the river are considered water resources projects under the Wild and Scenic Rivers Act and must also go through a Section 7 determination process. Within the River Protection Overlay, future actions shall be consistent with the following conditions:

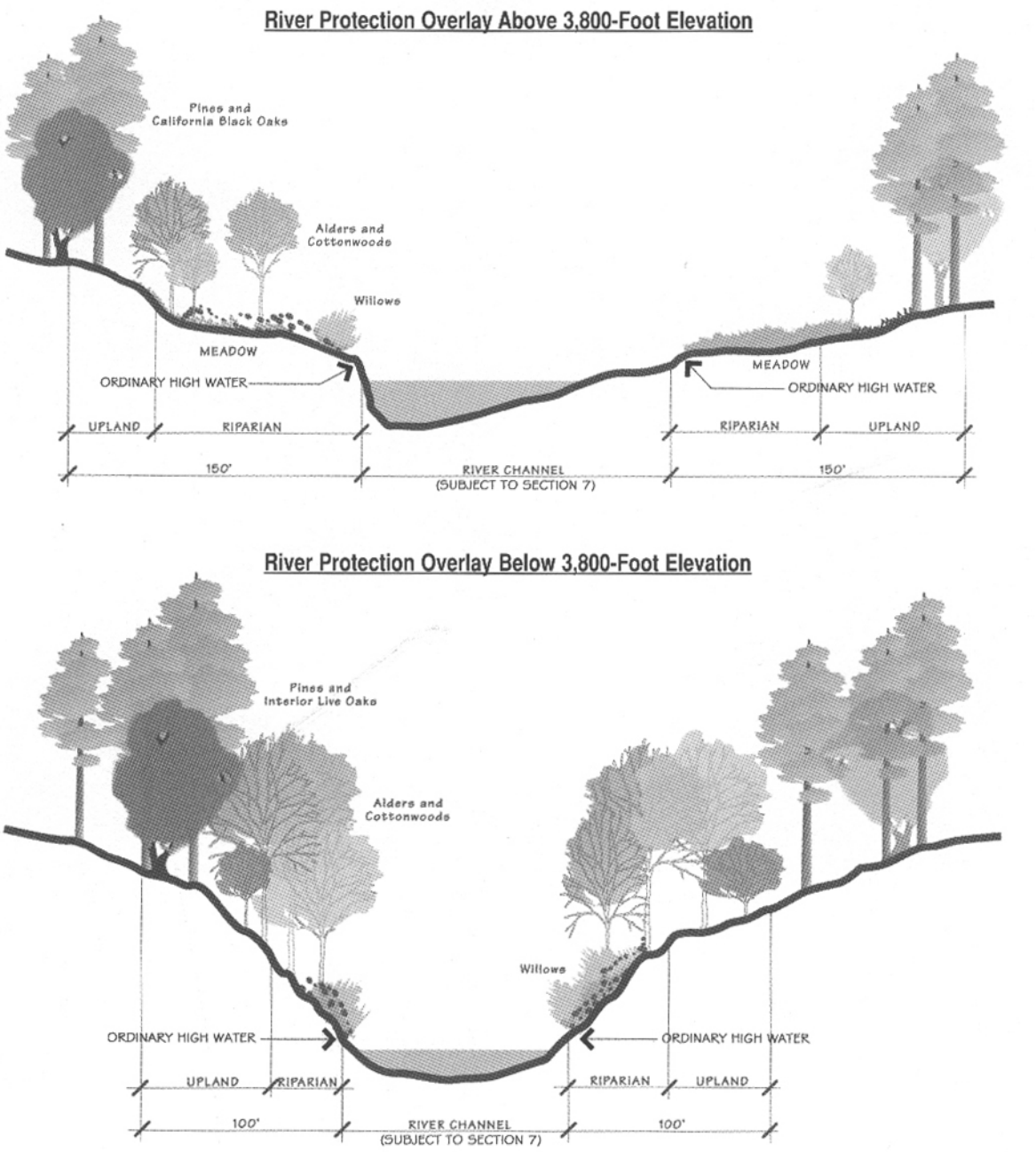
1. Nonessential facilities (including, but not limited to, riprap, levees, diversion walls, impoundments, bridges, bridge abutments, roads, campsites, buildings, utilities, and other structures) should not be located in the River Protection Overlay, except when they meet the following two criteria: (1) where required for access to or across the river, for health and safety, or for the maintenance of historic properties; and (2) where it is impractical to locate them outside the River Protection Overlay.
    - Existing facilities meeting these criteria may remain, and they may be replaced, repaired, or relocated within the River Protection Overlay, but only if the replacement, repair, or relocation does not directly and adversely affect the Outstandingly Remarkable Values.
    - New facilities and development may be constructed in the River Protection Overlay only when meeting these criteria and when located where they do not materially impair the natural function of the river, impede linkages to tributary inflow and backwater areas, or disrupt contribution of woody debris to the river, and where they do not have a direct and adverse impact on the Outstandingly Remarkable Values.

2. Actions within the bed and banks of the river to construct, replace, repair, or relocate essential facilities (i.e., primary roads and bridges, wastewater collection and treatment, domestic water supply, electrical distribution, and similar facilities required to keep the park operating) and facilities that directly protect and enhance the Outstandingly Remarkable Values (e.g., raft launch facilities to preserve the spectrum of recreational experiences and to concentrate use in a hardened area) may be permitted provided that:

- Project design minimizes impacts to the free-flowing condition of the river, interference with linkages to tributary inflow and backwater areas, and disruption of contribution of woody debris to the river.
- The project incorporates mitigation measures to avoid or reduce impacts.

3. Facilities and development covered by paragraphs 1 or 2, above, that occur within the bed or banks of the river and that affect the free-flowing condition of the river must also comply with Section 7 of the Wild and Scenic Rivers Act.
4. Other existing facilities that are not addressed by paragraphs 1 or 2 should be removed, and must be removed at the earliest practicable opportunity when major rehabilitation is needed or when a facility is no longer of use. Facilities proposed in the River Protection Overlay must meet the stringent requirements of its prescriptions. However, existing facilities in the River Protection Overlay are allowed to remain even if they do not conform with prescriptions. The National Park Service may address an existing, nonconforming facility in the River Protection Overlay at any time, such as through a planning effort.

River Protection Overlay Cross-Sections



Chapter 6
Addressing User Capacity through the Visitor Experience and Resource Protection (VERP) Framework

What is VERP?

In 1992, the National Park Service began developing the Visitor Experience and Resource Protection (VERP) framework to address visitor management and user capacity issues within the National Park System. In the VERP framework, user capacity is defined as: "The type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions that complement the purposes of the park units and their management objectives." VERP addresses user capacity by prescribing desired conditions for both the quality of resources and the visitor experience. Based on the desired conditions, VERP will identify the types and levels of visitor use that are appropriate, with particular focus on the protection of the Merced River's Outstandingly Remarkable Values.

Need for VERP Process

Under the 1978 National Parks and Recreation Act (P.L. 95-625), the National Park Service is required to address the issue of user capacity in its general management plans. National Park Service management policies and planning guidelines also acknowledge this responsibility. The VERP framework is used by the National Park Service to address user capacities in national parks. It is intended to safeguard the quality of both park resources and the visitor experience. Park resources in this context encompass all of the biophysical, aesthetic, and cultural elements and features contained in a park. Simply put, the VERP framework in Yosemite serves as a report card to measure how well the park is fulfilling its mission.

The VERP framework interprets user capacity as a prescription of desired ecological and social conditions. Based on these conditions, the process identifies and documents the kinds and levels of use that are appropriate, as well as where and when such uses should occur. The prescriptions—coupled with a monitoring program—are intended to give park managers the information and the rationale needed to make sound, science-based decisions about visitor use.

The Wild and Scenic Rivers Act [16 USC Section 1274(d)] calls for the establishment of a "user capacity" in all Wild and Scenic River management plans. Although the Act does not define the term "user capacity," the Interagency Guidelines for Wild and Scenic Rivers that guide agencies in implementing the Act define user capacity as "the quantity of recreation use which an area can sustain without adverse impact on the Outstandingly Remarkable Values and free-flowing character of the river area, the quality of recreation experience, and public health and safety." Designation as a Wild and Scenic River does not necessarily call for elimination of use or development. Uses compatible with the management goals of a particular river are allowed, and change is expected to happen. And as each designated river is unique, so will be the management necessary to insure its protection. According to the Act,

> *Each component of the national wild and scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its aesthetic, scenic, historic, archaeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area.*

VERP has been selected as one of the tools through which user capacity in the Merced Wild and Scenic River corridor will be addressed. VERP is included as one of the seven management elements that make up the *Merced Wild and Scenic River Comprehensive Management Plan.*

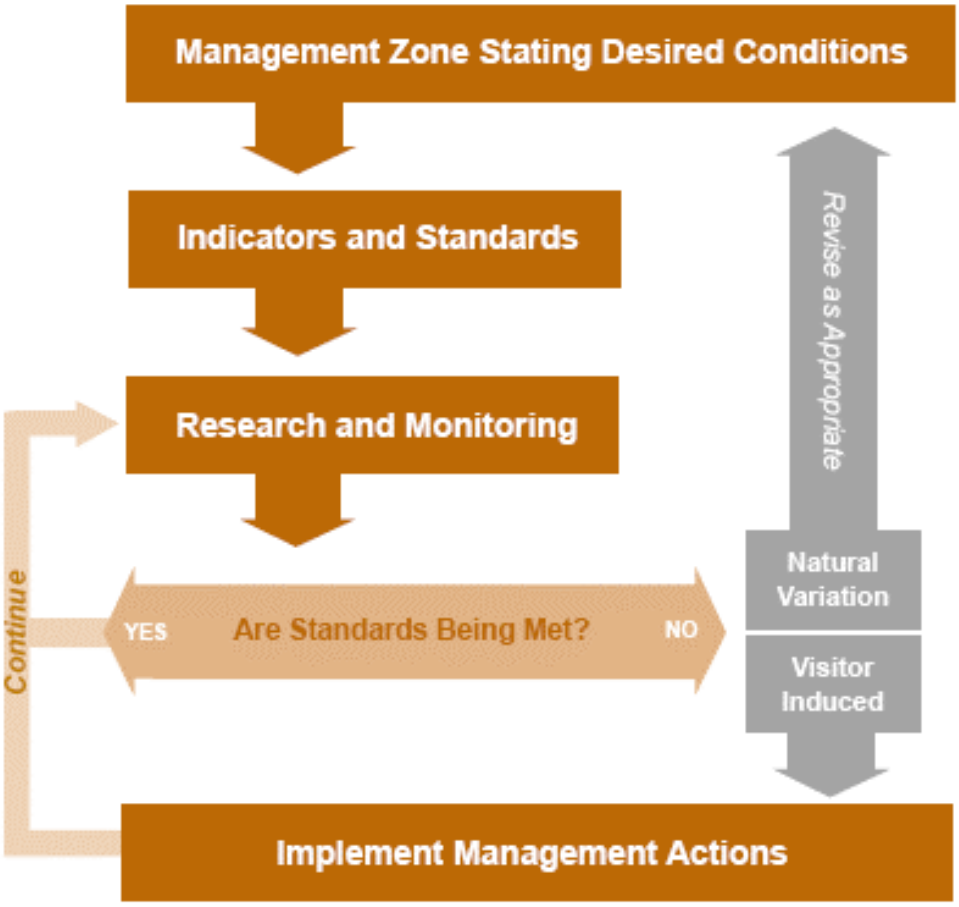
VERP fulfills the requirement to address user capacities by establishing an iterative process that

1) Establishes measurable indicators—resource or visitor experience conditions that can be measured.
2) Develops standards that set the threshold for the indicator.
3) Monitors each indicator and standard to ensure that the standard is not reached or exceeded.
4) Determines what (if any) management action should be taken to improve conditions.

Summary of the Framework

Nine steps are integral to the development of the VERP framework. While the scope of the elements, the order in which they are undertaken, and the specific methods used to complete the elements may vary in different situations, all of the elements are necessary to implement a VERP program. Although the elements are numbered and may appear to follow a linear process, it is important to remember that the VERP framework is iterative, with feedback and "feed-forward" occurring throughout the elements.

The Iterative Model of the
Visitor Experience and Resource Protection (VERP) Framework



The table below outlines the nine elements of the VERP framework and the implementation status of each element in Yosemite National Park.

VERP FRAMEWORK TASK		STATUS
Element 1:	Assemble an Interdisciplinary Project Team	✓ Completed as part of the development of the Merced River Plan
Element 2:	Develop a Public Involvement Strategy	✓ Completed as part of the development of the Merced River Plan
Element 3:	Develop Statements of Park Purpose, Significance, and Primary Interpretive Themes; Identify Planning Constraints	✓ Completed as part of the development of the Merced River Plan
Element 4:	Analyze Park Resources and Existing Visitor Use	✓ Completed as part of the development of the Merced River Plan
Element 5:	Describe a Potential Range of Visitor Experiences and Resource Conditions (potential prescriptive zones)	✓ Completed as part of the development of the Merced River Plan
Element 6:	Allocate the Potential Zones to Specific Locations in the Park (prescriptive management zoning)	✓ Completed as part of the development of the Merced River Plan
Element 7:	Select Indicators and Specify Standards for Each Zone; Develop a Monitoring Plan	✓ Completed winter 2003 in workshop conducted by the National Park Service
Element 8:	Monitor Resource and Social Indicators Additional steps in Yosemite's implementation: Analyze and evaluate indicator performance Continue monitoring with finalized indicators	Summer 2004 Fall 2004 Summer 2005
Element 9:	Management Action	To be enacted as needed in response to monitoring

Indicators and Standards for the Merced River Corridor

In the VERP model, measures of success are quantified through a series of indicators and standards. An indicator presents a subject to be measured (e.g., water quality, campsite condition, social trails) and is monitored periodically to detect change. A standard establishes the threshold for the indicator (e.g., there would be no more than X number of social trails in a given area). When the standard is reached or exceeded, management action can be taken if monitoring indicates conditions are changing to an undesirable level.

The indicators and standards established through the VERP framework do not assume a one-to-one relationship between an Outstandingly Remarkable Value and a given standard and indicator. The standards and indicators developed for the Merced River corridor can in some cases glean information regarding the health of a number of Outstandingly Remarkable Values. For example, by monitoring the length of social trails in meadows within Discovery (2B) and Day Use (2C) zones, resource managers are able to gain information regarding the condition of the following Outstandingly Remarkable Values:

1. The length and condition of social trails is indicative of the contiguity and ecological health of meadows and wetland areas (part of the biological Outstandingly Remarkable Value).
2. The length of social trails in meadows could be indicative of impacts to wildlife habitat, including special-status species (biological Outstandingly Remarkable Value).
3. Archeological sites and traditional gathering areas used by American Indian groups may exist in meadows, and could be affected by the proliferation of social trails in meadows (cultural Outstandingly Remarkable Values).
4. The extent of social trails in meadows may affect visitor experience, as meadows are enjoyable areas in which to engage in a variety of river-related related recreational opportunities—including nature study, photography, etc. (recreation Outstandingly Remarkable Value).
5. Social trails may impact the scenic interface of river, rock, meadow, and forest; thus monitoring the length of social trails in meadows contributes to the protection and enhancement of the scenic Outstandingly Remarkable Values.

As a result, monitoring will present data that crosses over several Outstandingly Remarkable Values, not just one. This benefits park managers by getting a host of data from which desired conditions can be assessed. Taken collectively, each of the indicators and standards presented in this report will enhance the scientific ORV through the collection and evaluation of data relating to the Merced River and its environment.

What are Indicators & Standards?

The standards and indicators that follow on pages 45-64 present (1) the indicator to be measured, (2) the standard to be achieved, and (3) the management zones that apply. Each set includes a rationale which provides some background for how these were developed. They were crafted during an internal workshop attended by experts from National Park Service program offices and Yosemite National Park subject matter experts and scientists. The goal of the workshop was to set in motion the implementation of the park's iterative VERP program. Namely, the team identified a set of standards and indicators that meet the desired future conditions established in the Merced River Plan and form the basis for monitoring resources and leading to management actions as needed.

Primarily, staff selected parameters that could not only apply to different management zones, but could also present the most comprehensive picture an area's overall condition—from both an ecological and visitor experience standpoint. The team identified standards and indicators using the following criteria:

Criteria for Identifying Indicators

- Is the indicator significant from either ecological or visitor enjoyment perspectives, or both?
- For each indicator, what parameter(s) will be measured?
- If only a subset of areas is monitored for this parameter, will the data provide comprehensive information that would be applicable to more than just those sites?
- Is this indicator/parameter applicable to the protection and enhancement of Outstandingly Remarkable Values in the Merced River corridor?

Criteria for Identifying Standards

- Have quantitative (i.e., measureable) desired future conditions been identified?
- Are standards in keeping with legislative mandates, regulations, and policies (see Chapter 1; e.g., Wild and Scenic Rivers Act, Endangered Species Act, Clean Water Act, Clean Air; Executive Orders, Organic Act, Management Policies, etc)?

As scientific data is collected, the cause-and-effect relationship between visitor use and the river's Outstandingly Remarkable Values can be better understood. Indicators and standards may need to be refined to better understand the nature of this relationship and to identify appropriate management action.

Monitoring and Management Actions

Monitoring is a key element in the VERP framework. It is vital to have reliable data on resource conditions and visitor use so that the park staff can determine if discrepancies are occurring between desired and existing conditions. Resource and visitor data need to be collected at regular intervals to show if standards are being exceeded. Monitoring intervals will vary depending on a number of factors, including

- the indicator being monitored
- the sampling strategy needed to understand natural variability and change over time
- the zones and visitor use levels in question (high use vs. low use areas)
- the efficient utilization of available staff and funding
- the length of time needed for a trend to become apparent

Monitoring results also play an essential role in determining which management actions should be taken to ensure that standards are not exceeded.

Each set of the following standards and indicators includes a description of some of the methods and techniques that might be used during monitoring, along with examples of options for potential management actions. The guidance and criteria set forth in the NPS Management Policies (see page 9) determines when and how management action shall be taken. The list of potential management actions given for a particular indicator does not limit the park's ability to act in response to information gained from monitoring. Rather, the actions characterized in the following standards and indicators illustrate a sampling of a larger range of actions that could be implemented. Because management actions can take many forms, it is not feasible to give an exhaustive list for each indicator and standard.

Should monitoring determine that management action is necessary, the public will have an opportunity to provide comments on the range of management actions proposed by the park. Depending on the action proposed, environmental compliance may be completed. For example, if monitoring in a given meadow determines that the standard for the number and extent of social trails is exceeded, the park might propose installation of a boardwalk or other protective measures. These proposals would be analyzed as part of a NEPA document and presented to the public for review and comment.

Description of Monitoring Techniques and Schedules

For some of the standard and indicators presented in this report, monitoring plans and schedules (like those in wilderness) have been in place for decades. For those programs that do not have monitoring programs in place, they will be developed this spring and implementation will begin this summer. Detailed monitoring plans will ensure that data are properly collected and will minimize the potential for misinterpretations and other errors. These technical plans will describe how, where, and when each indicator in each zone will be monitored.

The results of parkwide monitoring activities will be presented to the public. Monitoring plans for the following standards and indicators are currently being prepared, and on-the-ground work will begin in spring 2004.

Public Involvement

The goal of public involvement related to the VERP process is to provide the pubic with an opportunity to review and provide feedback on various aspects of the VERP process. Public review and input will occur in a number of ways. Because VERP is an iterative process, new standards and indicators will likely be developed by park staff and subject-matter experts. Existing standards and indicators may be refined as data is gathered and evaluated. New or refined indicators and standards will be presented to the public, along with the results of parkwide monitoring activities and pilot studies.

In addition, management actions taken in response to VERP monitoring may also involve public review. For example, management actions that would be subject to NEPA compliance (particularly in the form of an environmental assessment or environmental impact statement) would be subject to extensive public review and comment.

INDICATOR:	**CAMPSITE NUMBER**
ZONES:	**1A Untrailed, 1B Trailed Travel**
STANDARDS:	
Zone 1A	No net increase in number of active (non-recovering) campsites over the baseline identified in the Wilderness Impact Monitoring System (WIMS).
Zone 1B	No net increase in number of active (non-recovering) campsites over the baseline identified in the Wilderness Impact Monitoring System (WIMS).

Rationale for Indicator

The Wilderness Impacts Monitoring System (WIMS 1) was implemented in the 1980s to monitor and track changes in number and condition of campsites parkwide. At that time, over 5,500 campsites were photographed, mapped, and measured along trails and bodies of water. This record was partially replicated with 30 sites in the 1990s (WIMS 2) and is being monitored again in this decade, providing us with excellent data on which to assess the effectiveness of our management policies. This process tracks the number and condition of campsites, which give us indicators of quality of the resource and the visitor experience. Tracking the change in numbers of sites will give us an idea of the effectiveness of use limitations, restoration efforts, visitor education to protect the resource, and impacts to the Outstandingly Remarkable Values of the river. Using a net increase of active sites enables us to differentiate between sites which have been restored and/or moved to more appropriate spots and new, illegal sites that may damage resources.

The *Merced Wild and Scenic River Comprehensive Management Plan* (Merced River Plan) identified several biological Outstandingly Remarkable Values that are influenced by numbers of campsites in these more remote zones. Campsites can affect water quality and biological resources, such as vegetation and wildlife. Depending on their location, this indicator will also provide data relevant to visitor experience as expressed in the recreational, scenic, and cultural Outstandingly Remarkable Values.

Rationale for Standards

This standard represents the minimum acceptable standard because it uses baseline data from the 1980s, and use has leveled off or, in some years, decreased since then. More importantly, the park has actively restored or rehabilitated hundreds of poorly-sited, illegal, or potentially harmful campsites since the 1980s. These sites might be considered to be recovering as in some cases the vegetation has not fully reestablished. An increase in the number of sites that are being used and are not in this restoration mode would indicate that the park's management efforts were not effective enough to prevent impacts with the level of use currently allowed in the area.

Summary of Monitoring Methods

Campsite numbers have been actively tracked throughout the wilderness on 10-year cycles since the 1970s (Holmes Study). Target sites were successfully field-tested in the 1990s to eliminate the need to resurvey all 5,000+ sites, and are felt to be statistically sufficient by the Chief Park Scientist, J.W van Wagtendonk. These sites will be remeasured within the next 5 years. These locations are currently parkwide which will be helpful to show trends, but sites specific to the Merced River corridor will also be added to the set if the current target sites were deemed insufficient or to monitor a specific Outstandingly Remarkable Value such as a special-status species. Campsite numbers will be monitored by restoration crews, wilderness rangers, and/or volunteers.

Potential Options for Management Action

Management actions to control numbers could include focused educational efforts, restoration of campsites and trails, dispersing or limiting use in certain areas, more intensive law enforcement, signing, closures, etc.

References

Boyers, L., Fincher, M., van Wagtendonk, J; Fincher, M; 1999. Twenty-eight years of wilderness campsite monitoring in Yosemite National Park. In: Cole, D.N.; McCool, S.F. (2000) Proceedings: Wilderness Science in a time of Change Proc. RMRS-P-000. Ogden, UT. USDA Forest Service, Rocky Mountain Research Station.

Holmes, D.O. 1972. Yosemite backcountry inventory, summer 1972. USDI, Nat'l. Park Serv., Yosemite Nat'l. Park, CA. Final Report. 2295 p.

Parsons, D.J., and S. A. McLeod. 1980. Measuring impacts of wilderness use. Parks. 5(3):8-12.

Sydoriak, C.A. 1986. Yosemite wilderness trail and campsite impact monitoring system. USDI, Nat'l. Park Serv., Yosemite Nat'l. Park, CA. 25 p.

van Wagtendonk, J.W. 1981. The effects of use limits on backcountry visitation trends in Yosemite National Park. Leisure Sci. 4(3)311-323.

van Wagtendonk, J.W. 1986. The determination of carrying capacities for the Yosemite Wilderness. P. 456-461 in Proc. Nat'l. Wilderness Res. Conf.: Current Res. U SDA, Forest Serv. Gen. Tech. Rep. INT-212. 553 p.

van Wagtendonk, J.W., and P.R. Coho. 1986. Trailhead quotas: rationing use to keep wilderness wild. J. Forestry. 84(11):22-24.

INDICATOR:	**CAMPSITE CONDITION**
ZONES:	**1A Untrailed, 1B Trailed Travel**
STANDARDS:	
Zone 1A	95% of existing campsites are Class 1 or 2 (as identified in the Wilderness Impact Monitoring System), and no newly constructed sites exceed Class 2
Zone 1B	95% of existing campsites are Class 1 or 2 (as identified in the Wilderness Impact Monitoring System), and no newly constructed sites exceed Class 3

Rationale for Indicator

In the 1970s, over 7,000 backcountry campsites were mapped and described. By the 1980s, a more refined system called the Wilderness Impacts Monitoring System (WIMS 1) was implemented to more scientifically and completely monitor and track changes in number and condition of campsites parkwide. At that time, over 5,500 campsites were photographed, mapped and measured along trails and bodies of water using 11 different criteria ranging from vegetation density to visual impact. Each criterion had 5 rating factors which were weighted by their ecological importance, providing a summary rating of class. This study was partially replicated with 30 target sites in the 1990s (WIMS 2) and is being monitored again in this decade (WIMS 3), providing us with excellent data on which to assess the effectiveness of our management policies and/or impacts from use over time.

The Merced River Plan identified several biological Outstandingly Remarkable Values that are influenced by campsite condition in these more remote zones, including intact vegetation and wildlife. Biological communities will be affected by trampling, firewood collection, use of trails, and other human activities. Campsite condition can also affect Outstandingly Remarkable Values such water quality, visitor experience, scenic values, and cultural resources depending on camp location.

Rationale for Standards

This standard would be a minimum standard because use has leveled off or in some years decreased since the 1980s, and more importantly, the park has actively restored or rehabilitated hundreds of poorly sited, illegal or potentially harmful campsites since the 1980s. A campsite condition change sufficient to move to a higher class is a significant indication that we are not appropriately patrolling or maintaining the area, or that the amount, type or timing or use is causing damage.

Summary of Monitoring Methods

Campsite condition will be monitored at the target sites, using the 11 parameter/5 campsite class system at 30 sites before 2010 (WIMS 3), consistent with the campsite monitoring system already in place. These target locations are park wide which shows trends on a larger scale. Merced River specific sites will also be added to the set if the current target sites were deemed insufficient for some reason or to monitor a specific Outstandingly Remarkable Value such as a special-status species. Monitoring will be conducted by restoration crews, wilderness rangers, and/or volunteers using the established guidelines in the WIMS protocol.

Potential Options for Management Action

Management actions such as different educational focus, closures, more intensive law enforcement, signing, or a variety of other options could also be used to control impacts if data show unacceptable changes to the condition of the campsites, with its implications for the surrounding areas.

References

Boyers, L., Fincher, M., van Wagtendonk, J; Fincher, M; 1999. Twenty-eight years of wilderness campsite monitoring in Yosemite National Park. In: Cole, D.N.; McCool, S.F. (2000) Proceedings: Wilderness Science in a time of Change Proc. RMRS-P-000. Ogden, UT. USDA Forest Service, Rocky Mountain Research Station.

Cole, D. 1990 Ecological impacts of wilderness recreation and their management. Wilderness Management, Second Edition, International Wilderness Leadership Foundation.

Cole, D. 1989. Wilderness campsite monitoring methods: a sourcebook. USDA Forest Service, Intermountain Research Station, GTR INT-259. 57 p.

Holmes, D.O. 1972. Yosemite backcountry inventory, summer 1972. USDI, Nat'l. Park Serv., Yosemite Nat'l. Park, CA. Final Report. 2295 p.

Parsons, D J., and S.A. McLeod. 1980. Measuring impacts of wilderness use. Parks. 5(3):8-12.

Marion, J.L. 1991. Developing a natural resource inventory and monitoring program for visitor impacts on recreational sites: a procedural manual. NPS/NRVT/NRR-91/06. 59 p.

Sydoriak, C.A. 1986. Yosemite wilderness trail and campsite impact monitoring system. USDI, Nat'l. Park Serv., Yosemite Nat'l. Park, CA. 25 p.

van Wagtendonk, J.W. 1981. The effects of use limits on backcountry visitation trends in Yosemite National Park. Leisure Sci. 4(3)311-323.

van Wagtendonk, J.W. 1986. The determination of carrying capacities for the Yosemite Wilderness. P. 456-461 in Proc. Nat'l. Wilderness Res. Conf.: Current Res. U SDA, Forest Serv. Gen. Tech. Rep. INT-212. 553 p.

INDICATOR:	**NUMBER OF ENCOUNTERS WITH OTHER PARTIES**
ZONES:	**1A Untrailed, 1B Trailed Travel**
STANDARDS:	
Zone 1A	No more than one encounter with another party per day
Zone 1B	No more than six encounters with another party per day

Rationale for Indicator

One of the components of the recreational Outstanding Remarkable Value for the Merced River Plan is the opportunity for solitude. The Untrailed zone (1A) should provide a very high opportunity for solitude, which is also one of the components of federally designated Wilderness. Expectations of levels of solitude and actual numbers of groups encountered have a significant affect on the quality of visitor experience. Encounters are also an excellent way to assess levels of use, which can affect other Outstandingly Remarkable Values such as the biological, cultural, and scientific values set for the river corridor. Higher levels of use may result in compromised water quality.

Rationale for Standards

These standards are based on research done in the 1970s and in 2000 to determine standards of quality for encounters in various parts of the Yosemite Wilderness. Visitor satisfaction is currently measured by how people feel, noting what their expectation was, what their preference is, what they would tolerate, and what they think the agencies should manage for. In 2001/2002, the Newman Manning study recorded that meeting one party was the preference level when queried about this indicator of quality while in the remote portions of the wilderness (Untrailed zone 1A) and that visitors would prefer seeing only 6 other parties in the trailed areas comparable to Trailed Travel zone 1B. While it would be possible to manage for higher numbers if the park used the “tolerance” or “management” standard, wilderness managers would prefer to manage for the lower number to protect this Outstandingly Remarkable Value. This is particularly meaningful because levels of use often affect other Outstandingly Remarkable Values as mentioned above.

Summary of Monitoring Methods

Numbers of encounters are recorded on every wilderness ranger patrol. Patrols will also monitor encounters as the campsite monitoring is completed. Overall use is also tracked daily by the permit system and over 30 years of comparative data available to assess trends or change. Visitor surveys can also be used, especially those matched to the Newman Manning study, to track change from the baselines established in 2000. Levels of encounters have been monitored over these 30 years to assure the park’s trailhead entry system is working effectively on locations inside the wilderness. These studies are easily implemented by wilderness staff at the trailhead if significant change is reported by patrol staff or visitors.

Potential Options for Management Action

Numbers of encounters could be controlled through the trailhead quota system, through educational messages, and through closures.

References

Absher, J.D., Lee, R.G. 1978. Analysis of sociological carrying capacity for the Yosemite National Park backcountry. USDI National Park Service. Rinal Res. Rep. CX 8000-6-005. Western Regional Office, San Francisco, CA. 57 p.

Newman, P., Manning, R. 2002. Integrating social, ecological, and managerial indicators of quality into carrying capacity decision making in Yosemite National Park Wilderness. Final Report. University of Vermont. 132 p.

van Wagtendonk, J.W. 1981. The effects of use limits on backcountry visitation trends in Yosemite National Park. Leisure Sci. 4(3)311-323.

van Wagtendonk, J.W. 1986. The determination of carrying capacities for the Yosemite Wilderness. P. 456-461 in Proc. Nat'l. Wilderness Res. Conf.: Current Res. U SDA, Forest Serv. Gen. Tech. Rep. INT-212. 553 p.

INDICATOR:	**PEOPLE AT ONE TIME AT SELECTED SITES**
ZONE:	**1C Heavy Use Trail**
STANDARD:	Not more than 20 people on a 50-meter section of the trail, which equates to 66 square feet per person in this zone.

Rationale for Indicator

In wild segments of the river, the Merced River Plan characterizes the recreational Outstandingly Remarkable Value as a "spectrum of levels for recreational use and opportunities for solitude with primitive and unconfined recreation." The Merced River Plan zoned only one area as Heavy Use Trail: the section of the corridor from Moraine Dome Campground to the top of Nevada Fall. The Heavy Use Trail zone is characterized by exceptionally high amounts of day use due to Half Dome traffic, as well as large amounts of overnight users headed to Little Yosemite Valley. Visitor expectations are more similar to encounter levels in Yosemite Valley, but because this area is within designated Wilderness, some limits should apply. This indicator will allow managers to assess encounter levels and visitor satisfaction more reasonably than numbers of groups encountered due the large numbers of visitors on this section of trail. Numbers of people at one time can also be used to assess levels of use, which can affect other Outstandingly Remarkable Values such as the biological, cultural, and scientific values set for the river corridor. Higher levels of use may result in compromised water quality ("excellent water quality" is a component of the hydrologic processes Outstandingly Remarkable Value in wild segments of the river).

Rationale for Standard

These standards are based on research done in 1998-1999 by Robert Manning et al. to determine standards of quality for encounters at destinations in Yosemite Valley coupled with the finding of the Newman Manning study that assessed visitor satisfaction in wilderness locations. Visitor satisfaction is currently measured by how people feel, noting what their expectation was, what their preference is, what they would tolerate, and what they think the agencies should manage for. In 2001/2002, the Newman Manning study recorded that visitors would tolerate meeting 50 people per day hiking on this type of trail. Due to the unique demand and facilities located along the river in this area, it was decided that the tolerance standard could be applied in this case.

Summary of Monitoring Methods

Observational records will be made on a regular basis. Visitors will be surveyed at least twice in the next 7 years and then periodically thereafter. These surveys will allow the park to track change in terms of experiential quality. These surveys will be matched to the Newman Manning study to track change from the baselines established in 1999. Observations and surveys will be done over a varied period of time during the sample period to assure sample size sufficiency. If there was a need to assess this data to establish use patterns, numbers of encounters have been recorded for over 30 years on wilderness ranger patrol logs. Day use studies of numbers of users were done in the 1990s on this trail segment and will be replicated by wilderness staff if significant change is reported by patrol staff or visitors.

Potential Options for Management Action

Levels of overnight use could be controlled through the trailhead quota system, through educational messages, and through closures. Day use is currently not restricted, but could be managed if research and monitoring show that management goals are not being met.

References

Absher, J.D., Lee, R.G. 1978. Analysis of sociological carrying capacity for the Yosemite National Park backcountry. USDI National Park Service. Rinal Res. Rep. CX 8000-6-005. Western Regional Office, San Francisco, CA. 57 p.

Boston, C. 1994. 1994 day use survey. USDI National Park Service, Internal Report. 11p

Manning, R., B. Wang, W. Valliere, and S. Lawson. 1998. Carrying Capacity Research for Yosemite Valley: Phase I Study. Burlington, Vermont: University of Vermont.

Manning, R., W. Valliere, S. Lawson, B. Wang, and P. Newman. 1999. Carrying Capacity Research for Yosemite Valley: Phase II Study. Burlington, Vermont: University of Vermont.

Newman, P., Manning, R. 2002. Integrating social, ecological, and managerial indicators of quality into carrying capacity decision making in Yosemite National Park Wilderness. Final Report. University of Vermont. 132 p.

van Wagtendonk, J.W. 1981. The effects of use limits on backcountry visitation trends in Yosemite National Park. Leisure Sci. 4(3)311-323.

van Wagtendonk, J.W. 1986. The determination of carrying capacities for the Yosemite Wilderness. P. 456-461 in Proc. Nat'l. Wilderness Res. Conf.: Current Res. U SDA, Forest Serv. Gen. Tech. Rep. INT-212. 553 p.

INDICATOR:	**EXPOSED TREE ROOTS**
ZONE:	**1D Designated Overnight**
STANDARD:	Not more than 4 trees, or moderate level of exposed roots in majority of trees, per target campsite

Rationale for Indicator
Exposed tree roots have been used in a number of studies of human-caused impacts to wilderness areas because they are a good indicator of soil erosion due to visitor or stock use. Erosion is not only of concern by itself due to the implication of vegetation loss and damage to the tree, but also due to impacts to multiple soil horizons, compaction, and potential for siltation and water quality impacts. Exposed roots can also indicate a level of use that will affect other resources around it such as impacts to wildlife, other vegetation besides those underfoot, and water quality by pathogens as opposed to turbidity. Monitoring can show changes in use over time, with measurable indicators of severity.

The Wilderness Impacts Monitoring System (WIMS 1) has measured exposed roots since the 1980s. Historical data with which to monitor and track changes in number of exposed roots at sites parkwide allow us to assess amount of change over time.

Several Outstandingly Remarkable Values are directly affected by exposed roots and the impact they represent, including affects to water quality, cultural resources, ecological habitats, and the scientific integrity of an unchanged environment. Exposed roots also negatively affect the recreational experience. Prolonged or extreme amounts of exposed roots can kill the tree.

Rationale for Standard
This standard is based on the "middle" class of the parameter, and would relate to the condition of a Class 3 campsite, which is in line with the campsite condition of this zone.

Summary of Monitoring Methods
This parameter was developed in the WIMS 1 study of the 1980s, and has been replicated for the last 25 years in wilderness condition surveys. Campsites that are definable and easy to locate will be identified and mapped in the Little Yosemite Valley Campground. Trees with exposed roots within those defined sites will be counted and recorded. This will be done at whatever interval is deemed appropriate by resident staff. The minimum will be twice in the next 7 years. If significant change occurs between two monitoring events, more frequent monitoring will be implemented. This will be done only in the Little Yosemite Valley Campground, which is the only area zoned as Designated Overnight. This area is an anomaly to the rest of the wilderness because it is a campground with designated sites and nightly ranger patrols.

Potential Options for Management Action
A decline of one class could trigger one or more management actions to prevent future soil loss/impact to the area. Management actions such as providing visitor education about impacts, closures, reduction or change in amount/timing/type of use, more intensive law enforcement, signing, or a variety of other options could also be used to control impacts.

References

Boyers, L., Fincher, M., van Wagtendonk, J.; Fincher, M; 1999. Twenty-eight years of wilderness campsite monitoring in Yosemite National Park. In: Cole, D.N.; McCool, S.F. (2000) Proceedings: Wilderness Science in a time of Change Proc. RMRS-P-000. Ogden, UT. USDA Forest Service, Rocky Mountain Research Station.

Cole, D. 1990 Ecological impacts of wilderness recreation and their management. Wilderness Management, Second Edition, International Wilderness Leadership Foundation.

Cole, D. 1989. Wilderness campsite monitoring methods: a sourcebook. USDA Forest Service, Intermountain Research Station, GTR INT-259. 57 p.

Holmes, D. O. 1972. Yosemite backcountry inventory, summer 1972. USDI, Nat'l. Park Serv.,Yosemite Nat'l. Park, CA. Final Report. 2295 p.

Marion, J.L. 1991. Developing a natural resource inventory and monitoring program for visitor impacts on recreational sites: a procedural manual. NPS/NRVT/NRR-91/06. 59 p.

Parsons, D.J., and S. A. McLeod. 1980. Measuring impacts of wilderness use. Parks. 5(3):8-12.

Sydoriak, C.A. 1986. Yosemite wilderness trail and campsite impact monitoring system. USDI, Nat'l. Park Serv., Yosemite Nat'l. Park, CA. 25 p.

INDICATOR:	**NUMBER OF SOCIAL TRAILS**
ZONES:	**2A Open Space, 2A+ Undeveloped Open Space**
STANDARDS:	
Zone 2A	No net increase in number from 1990 baseline for linear features
	No social trails for wetland features
Zone 2A+	No net increase in number from 1990 baseline

Rationale for Indicator

The Open Space and Undeveloped Open Space zones (2A and 2A+) include the relatively inaccessible and undisturbed canyon rims and walls along the gorge of the main stem of the Merced River and below Wawona along the South Fork of the Merced River. In addition, the fen near Happy Isles and Wosky Pond below El Capitan are included in Zone 2A. These areas receive limited use associated primarily with access to climbing routes. Social trails are an indicator of that incidental use. As use increases, the number of social trails will also increase. Tracking the number of social trails will give the park an indication of the level of use that is occurring and whether or not that use is increasing. In the case of the two wetlands, any social trails could lead to disruption of the ecological processes.

The number of social trails is indicative of the contiguity and ecological health of meadows and wetland areas (part of the biological Outstandingly Remarkable Value). It is also indicative of impacts to wildlife habitat, including special-status species (biological Outstandingly Remarkable Value). Archeological sites and traditional gathering areas used by American Indian groups exist in some meadows, and could be affected by the proliferation of social trails in meadows (cultural Outstandingly Remarkable Values). The extent of social trails in meadows may affect visitor experience, as meadows are enjoyable areas in which to engage in a variety of river-related related recreational opportunities—including nature study, photography, etc. (recreation Outstandingly Remarkable Value). Social trails may impact the scenic interface of river, rock, meadow, and forest; thus monitoring the number of social trails in meadows contributes to the protection and enhancement of the scenic Outstandingly Remarkable Value.

Rationale for Standard

A no net increase standard would ensure that impacts would not continue to increase and that the Outstandingly Remarkable Values within these segments would be protected. The "no net increase" standard allows for the management objectives of each zone to be realized because

1. high visitor use areas currently have more social trails than low visitor use areas, and
2. the National Park Service aggressively works to remove trails from sensitive areas and to reduce and localize the effects (using boardwalks and other tools when necessary).

Summary of Monitoring Methods

For the linear segments of these zones along the canyons, a monitoring inventory will have to be conducted in 2004. For the 2A zone from below the Wawona Road tunnel to Elephant Rock, the inventory method would involve a GPS mapping of the area. Resource Management staff will walk parallel to the Wawona Road or the upper boundary of the segment whichever is lowest at a distance of 20 meters with a GPS unit and record and map the occurrence of every social trial encountered along the way. For the 2A segment above and north of the El Portal Road, the inventory will be conducted 20 meters above the road. The 2A segment in Wawona and the 2A+ segments along the main stem and the South Fork will be monitored 20 meters from the river's edge.

Potential Options for Management Action

Educational signs to direct visitors away from an affected area might be an alternative if impacts from use become too high. A natural rock barrier along the road at Wosky pond could prevent cars from nearing the pond and could reduce the number of inadvertent visitors seeking to walk in the area.

INDICATOR:	**LENGTH OF SOCIAL TRAILS IN MEADOWS**
ZONES:	**2B Discovery, 2C Day Use**
STANDARDS:	
Zone 2B	No net increase in length from 1990 baseline
Zone 2C	No net increase in length from 1990 baseline

Rationale for Indicator

The meadows in Yosemite Valley's Discovery and Day Use zones (2B and 2C) constitute a component of the biological Outstanding Remarkable Value within this segment of the Merced River corridor. Their ecological integrity and scenic quality are degraded by multiple social trails that cross them. Use of these meadows by visitors is considerable, as they are very lush, attractive, and inviting places to stop and enjoy scenery. Increases in social trails can also affect the recreational Outstandingly Remarkable Value.

Stoneman, Ahwahnee, Cook's, and Sentinel Meadows are within the Discovery Zone 2B, while Leidig, El Capitan, and Bridalveil Meadows are within Day Use Zone 2C. Stoneman Meadow lies between Lower Pines Campground and Curry Village. As a result, many park visitors cut across Stoneman Meadow in both directions, creating a spider-like network of social trails. In 1991, park management took action to protect the meadow while allowing for and directing visitor use by installing an elevated boardwalk. Similarly, protective boardwalks have also been placed in Sentinel Meadow and most recently in Cook's Meadow in 2001. Interpretive signs in these areas explain the important role of meadows and wetlands and how visitors can help by staying on the boardwalks.

The remaining Yosemite Valley meadows are adjacent to roads and visitors routinely enter them from turnouts, particularly at El Capitan Meadow where people venture into the meadow to view climbers. Social trails originate at the turnouts and radiate across the meadows. These trails are well suited for monitoring since they are readily apparent, easily measured, attributable to use, and indicative of ecological damage. Because they cross and intertwine, it would be difficult to count the numbers of social trails. Instead, the best indicator to monitor will be the total length of social trails.

The length of social trails is indicative of the contiguity and ecological health of meadows and wetland areas (part of the biological Outstandingly Remarkable Value). It is also indicative of impacts to wildlife habitat, including special-status species (biological Outstandingly Remarkable Value). Archeological sites and traditional gathering areas used by American Indian groups exist in some meadows, and could be affected by the proliferation and length of social trails in meadows (cultural Outstandingly Remarkable Values). The extent of social trails in meadows may affect visitor experience, as meadows are enjoyable areas in which to engage in a variety of river-related recreational opportunities—including nature study, photography, etc. (recreation Outstandingly Remarkable Value). Social trails may impact the scenic interface of river, rock, meadow, and forest; thus monitoring the length of social trails in meadows contributes to the protection and enhancement of the scenic Outstandingly Remarkable Value.

Rationale for Standard

A no net increase standard will ensure that impacts would not continue to increase and that the meadows' Outstandingly Remarkable Values would be protected. Restoration could occur in some meadows, and recovering trails would therefore be removed from the length calculation. The "no net increase" standard allows for the management objectives of each zone to be realized because

1. high visitor use areas currently have more social trails than low visitor use areas, and

2. the National Park Service aggressively works to remove trails from sensitive areas and to reduce and localize the effects (using boardwalks and other tools when necessary).

Summary of Monitoring Methods

The baseline will be determined from USGS digital orthophoto quarter quadrangles (DOQQs) derived from aerial photography in the early 1990s. Social trails will be identified on the DOQQs and then recorded and mapped by resource managers with a GPS in the field. DOQQs are provided by USGS at approximately 10-year intervals, but additional photography could be flown more frequently if necessary. New trails can be identified on the photographs using a GIS and then measured in the field.

Potential Options for Management Action

Educational signs directing visitors away from more heavily used areas might be an alternative if impacts from use get too high. Boardwalks could be installed in the Day Use/2C zone meadows. However, there would have to be a determination about the extent to which boardwalks might distract from the scenic Outstandingly Remarkable Value within this zone, and the extent to which additional boardwalks could infringe on the meadow's ecological integrity. Adjacent to Discovery/2B zone meadows, removal of roadside turnouts could be necessary.

References

Parsons, D.J., and S.A. MacLeod. 1980. Measuring impacts of wilderness use. Parks 5(3): 8-12.

Cole, D.N. Monitoring the condition of wilderness campsites. USDA Forest Service Gen. Tech. Rep. INT-302. 10 p.

Schreiner, E.S., and B.B. Moorehead. 1979. Human impact inventory and management in the Olympic National Park backcountry. P. 203-212 in: Proceedings recreational impact on wildlands. USDA Forest Service R-6-001-1979. 341 p.

Marion, J.L. 1991. Developing a natural resource inventory and monitoring program for visitor impacts on recreation sites: a procedural manual. National Park Service Nat. Res. Rep. NPS/NRVT/ NRR-91/06.

INDICATOR:	**RIVER BANK EROSION THAT IS ACCELERATED OR CAUSED BY VISITOR USE**
ZONES:	**2B Discovery, 2C Day Use**
STANDARDS:	
Zone 2B	No net increase over baseline in linear extent of river bank erosion that is accelerated or caused by visitor use; no river bank erosion that exceeds Condition Class 2.
Zone 2C	No net increase over baseline in linear extent of river bank erosion that is accelerated or caused by visitor use; no river bank erosion that exceeds Condition Class 2.

Rationale for Indicator

River bank erosion has been selected as an indicator because soils are integral to the stability and integrity of riparian ecosystems. Although soil erosion occurs along the river as a result of natural river processes, such erosion can be accelerated and exacerbated by visitor use (i.e., repeated trampling). Increasing visitor use on susceptible soils often results in increased soil erosion, so this indicator is valuable for assessing a site's ability to sustain varying amounts of visitor use.

Riverside soils and vegetation regulate the entry of groundwater, surface runoff, nutrients, sediments and other particulates, and fine and course organic matter to rivers and streams, thus affecting water quality. Accelerated erosion associated with trampling can alter these processes, leading to changes in water quality. It also can initiate formation of gullies and headcuts, which can lower water tables and change drainage patterns through meadows, resulting in the "drying out" of the meadow.

In addition to indicating loss of soil, measuring the amount of river bank erosion associated with visitor use will be used as an indicator of changes that may be occurring to cultural Outstandingly Remarkable Values within the segment—namely to archeological sites (if archeological sites occur within erosion monitoring sites). Soil erosion along river banks that occurs at archeological sites would indicate a loss to the site stability. This loss of soil stability would then indicate loss of intact archeological artifacts and features, critical components of archeological site integrity. Once artifacts and features are displaced from their original context or lost, the information inherent to those deposits is also lost.

The Merced River Plan identified several components of the biological, scenic, and recreation Outstandingly Remarkable Values that relate to river bank soil stability. For the Yosemite Valley segment, the components of the biological Outstandingly Remarkable Value include riparian areas and low elevation meadows, and high quality riparian, wetland, and other riverine areas of large extent. For the gorge segment, these components include "…diverse riparian areas and associated special-status species…" Additionally, the cultural resource Outstandingly Remarkable Value includes "…evidence of thousands of years of human occupation reflected in a large number of archeological sites and continuing traditional use today." For the Wawona and El Portal segments, it includes critical riparian habitat and special-status wildlife species. These segments also provide a range of river-related recreational opportunities, which is a component of the recreation Outstandingly Remarkable Value.

Rationale for Standards

The standard is the same across management zones because soil erosion degrades riverbanks no matter where the zone occurs. Soil erosion can impair the natural function of the river, which is an important

element of the geologic and hydrologic processes Outstandingly Remarkable Values. Loss of river bank cannot be replaced. Preliminary standards for river bank erosion that is accelerated or caused by visitor use were established based on the best professional judgment of staff scientists and restoration specialists. These standards will be reassessed and modified if needed following the first season of baseline data collection.

Summary of Monitoring Methods

Initially, data on the existing condition of river banks within the river corridor in these two zones will be collected (i.e., baseline data) by walking the length of the riverbank in zones 2B and 2C. The locations of all sites exhibiting erosion (either natural or human caused or accelerated), will be measured in linear meters, assessed for condition, and mapped along with any identified archeological sites.

All sites determined to be eroding as a result of visitor use, or a combination of natural processes and visitor use, will be evaluated using a condition classification system. This condition classification system will be developed during the first year of baseline data collection (spring and summer 2004). An example of a possible classification system would have classes ranging from Class 1 (best condition, least erosion) to Class 4 (worst condition, most erosion). Classes will be determined by the size of the area experiencing the erosion (both linear extent along the river and distance erosion extends away from the riverbank), and the magnitude of gullying or headcutting. The size of the affected area will be documented using global positioning system (GPS). Photographs of examples of each condition class will be taken to supplement field measurements.

Once baseline data have been collected for all erosion sites, detailed methodology will be developed for long-term monitoring of the sites. This will include a determination of which sites will be monitored, data to be collected during monitoring, and frequency of monitoring. Monitoring sites will be located outside of designated trails and campsites.

Several small and large scale river bank restoration projects are planned for the future, which will result in substantial decreases in linear feet of erosion. When these areas are restored, the linear feet of river bank that were restored will be subtracted from the baseline for future monitoring.

Potential Options for Management Action

Soil erosion along river banks within the river corridor could be reduced or reversed through a variety of management actions. Possible actions include placing interpretive signs to help direct visitors to areas better able to withstand use, constructing fences or boardwalks to restrict or redirect access; rerouting or eliminating trails; establishing further controls on river rafters; or relocating attractions such as picnic areas.

Reference

Kattelmann R. and M. Embury. 1996. Riparian Areas and Wetlands *in* Sierra Nevada Ecosystem Project Final Report to Congress, Volume III - Assessments and Scientific Basis for Management Options, Section 5, pp. 201-274.

INDICATOR:	**EXPOSED TREE ROOTS**
ZONE:	**3A Camping**
STANDARD:	95% of campsites meet the no, slight, or moderate root exposure criteria as defined by inventory and monitoring guidelines (Marion 1991).

Rationale for Indicator

Exposed tree roots have been used in a number of studies of human-caused impacts to wilderness areas because they are a good indicator of soil erosion due to visitor or stock use. Erosion is not only of concern by itself due to the implication of vegetation loss and damage to the tree, but also due to impacts to multiple soil horizons, compaction, and potential for siltation and water quality impacts. Exposed roots can also indicate a level of use that will affect other resources around it, such as impacts to wildlife, other vegetation besides those underfoot, and water quality by pathogens as opposed to turbidity. Monitoring can show changes in use over time, with measurable indicators of severity.

Several Outstandingly Remarkable Values within the Camping/3A zone are directly affected by exposed roots and the impact they represent, including affects to water quality, cultural resources, ecological habitats, and the scientific integrity of an unchanged environment. Exposed roots also negatively affect the recreational experience. Prolonged or extreme amounts of exposed roots can kill the tree.

Rationale for Standards

Standards were developed (Marion 1991) using root exposure as a method to monitor visitor impacts on recreation sites. Marion describes three categories:

1) None/slight—no or slight root exposure such as is typical in adjacent offsite areas
2) Moderate—top half of many major roots exposed more than 1 foot from base of tree
3) Severe—three-quarters or more of major roots exposed more than 1 foot from base of tree; soil erosion obvious.

These standards will be reassessed and modified if needed following the first season of baseline data collection.

Summary of Monitoring Methods

Tree roots will be sampled in each campground in zone 3A using the quarter-point method. This is a plotless technique that will be centered at the picnic table at the campsite. The nearest tree in each quadrat will be evaluated as to the number and severity of exposed roots. In the spring and summer of 2004, a pilot study will be performed to determine the sampling size needed to adequately sample each campground in zone 3A. The standard may be modified once the pilot study is completed and preliminary data is analyzed.

Potential Options for Management Action

Campsites exceeding the moderate category of exposed tree roots could be restored with native soil and duff. This might require fencing and/or closing off the campsite for a year to allow the damage to recover.

References

Cole, D. 1989. Wilderness campsite monitoring methods: a sourcebook. USDA Forest Service, Intermountain Research Station, GTR INT-259. 57 p.

Frissell, S.S. 1978. Judging Recreation Impacts on Wilderness Campsites. Journal of Forestry.

Marion, J.L. 1991. Developing a Natural Resource Inventory and Monitoring Program for Visitor Impacts on Recreational Sites: A Procedural Manual. NPS/NRVT/NRR-91/06. 59 p.

INDICATOR:	**WATER QUALITY**
ZONE:	**1D Designated Overnight, 2A Open Space, 2C Day Use, 2D Attraction, 3A Camping, 3B Visitor Base and Lodging, 3C Park Operations and Administration, but it is more practical to establish standards by segment than by zone.**
STANDARD:	Anti-degradation for each segment, for fecal coliform, nutrients (total nitrogen and total phosphorus), and hydrocarbons. Absolute minimum, all segments: State fecal coliform standard for recreational contact

Rationale for Indicator

Nutrient levels (total nitrogen, total phosphorus) and fecal coliform are appropriate variables to monitor because their levels can be tied to human activities and human contact with water. People swimming in the river or manure from horses can lead to elevated levels of fecal coliform; people bathing or washing dishes in the river can increase phosphorus /phosphate (i.e. nutrients) levels. Vehicular use, roads and other development contributes to hydrocarbon pollution. Total coliform, temperature, dissolved oxygen, and conductivity will vary with human use, but are not effective variables to monitor (as indicators) because they are lagging indicators of human impact and can be affected by other factors.

It is difficult to isolate the direct influence of human use on water quality, although it is somewhat easier in areas of high visitor use. For this reason, water quality should be used as an indicator only in high visitor use areas. Water quality would not be a fruitful indicator in wilderness areas (with the possible exception of Little Yosemite Valley); it could not be assumed that the sole cause of variability in water quality measurements would be human use (for example, wildlife might contribute to spikes in bacteriological levels). Thus, for wilderness areas, the indicators and standards presented earlier in this chapter have been selected to provide information about water quality in wild river segments.

Excellent water quality was identified by the Merced River Plan as part of the hydrologic processes Outstandingly Remarkable Value in three segments of the river corridor: in the wilderness reaches of the main stem and South Fork, as well as in the impoundment segment of the South Fork (above Wawona).

Rationale for Standard

An anti-degradation standard will be used for all park river segments, including Wawona and El Portal. Anti-degradation means that water quality would remain un-impacted by human (and vehicular) use as compared to baseline (existing) conditions. To establish a baseline may require three to ten years of sampling (to achieve statistically valid results).

In addition to an anti-degradation standard, the State of California has developed standards for fecal coliform for the San Joaquin River Basin (which includes the Merced River), for the protection of recreational waters with body-contact (e.g., swimming, boating, etc.): fecal coliform concentrations based on a minimum of not less that 5 samples for any 30-day period shall not exceed a geometric mean of 200 MPN[5]/100 ml, nor shall more than 10% of the total number of samples taken during any 30 day period exceed 400 MPN/100 ml. This standard is the absolute minimum allowed by the Clean Water Act; all segments of the Merced River are required to comply with this standard.

[5] MPN stands for Most Probable Number and represents a statistical approach to determining the fecal coliform level based on the number of positive biochemical tests indicating the presence of the bacteria in a series of dilutions form one sample.

Summary of Monitoring Methods

For 2004 and near term, water samples will be taken from 3 locations in Yosemite Valley, at roughly monthly intervals[6], with some event-based scheduling; and, at locations near water treatment facilities in El Portal and Wawona, at intervals prescribed in State permits. (The National Park Service currently monitors water quality above and below the treated water discharge points for the wastewater treatment plants in El Portal and Wawona, as required by State operating permits to assure attainment with State standards.)

Sampling results will be used in a temporal monitoring approach, meaning water quality results from a particular location will be compared to past results from the same location.

To establish the baseline needed to develop an anti-degradation standard, additional monitoring will be needed. The numbers of sites and samples needed depends upon the variability found within monitoring results.

Potential Options for Management Action

If significantly elevated concentrations of fecal coliform, nutrients (total nitrogen and total phosphate) and/or hydrocarbon are found, cause will be investigated and management action will be taken to reduce impacts. This will occur even before an anti-degradation standard is established.

Routine management action could include law enforcement patrols to enforce regulations pertaining to camping, bathing, dishwashing, trash disposal, leash laws, swimming, rafting, fishing, petroleum hydrocarbon spills, etc. Management action in response to elevated levels could include investigations to find the source of the degradation, and efforts to apply remedies. Major actions to protect water quality could potentially include closure of certain areas, cessation of certain activities, improved treatment of surface water runoff of paved surfaces, and others as indicated by monitoring.

References

National Park Service, 2003. Interim Technical Guidance on Assessing Impacts and Impairment to Natural Resources.

State of California, 1998. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region. Fourth Edition—1998. California Regional Water Quality Control Board.

[6] This work will be in addition to and does not take the place of monitoring efforts to comply with the mandates of the Clean Water Act.

Chapter 7
Addressing User Capacity for Other Outstandingly Remarkable Values

Cultural Outstandingly Remarkable Values

The National Park Service uses resource management policies, procedures, and professional practices to address protection and enhancement of resources that collectively form the Cultural Outstandingly Remarkable Values. These components are applied in a coordinated manner in the management of archeological sites, historic structures, and cultural landscape resources—all of which are elements of the Merced River's cultural Outstandingly Remarkable Value. While they are not components of the VERP framework, they generate similar information regarding health of resources, nature of threats and disturbances, and recommended management treatments.

The following tools assist the National Park Service in the protection and enhancement of cultural Outstandingly Remarkable Values within the Merced River corridor:

- **The Archeological Sites Management Information System (ASMIS) and the List of Classified Structures (LCS)** are monitoring programs designed to amass quantified data on the condition of, and threats and disturbances to, individual cultural resources that form part of the Cultural Resource Outstandingly Remarkable Values of the Merced Wild and Scenic River.

- **Director's Order 28: Cultural Resource Management Guidelines** is the basis for cultural resource management programs for protecting and preserving these resources.

- **Advisory Council on Historic Preservation's criteria of effect and adverse effect** establish the standards (or thresholds) at which cultural resources will be managed in order to protect and enhance these as Outstandingly Remarkable Values.

- **The Secretary of the Interior's Standards for Treatment of Historic Properties** identifies the acceptable approaches to the treatment of historic properties (historic structures, buildings, landscapes, and archeological sites) so that their characteristics of historical significance are protected. These standards are followed when taking any management action triggered by feedback from monitoring programs, and include guidance on preservation maintenance, rehabilitation, restoration and reconstruction.

- ***A Sense of Place*: Design Guidelines for Yosemite National Park** describes proactive measures to prevent degradation of the natural and cultural environment when designing new facilities or rehabilitating existing facilities. These guidelines were created in response to the anticipated volume of planning and design associated with implementing the *Yosemite Valley Plan*, but applies to all facility-based development actions throughout the park.

Monitoring Cultural Resources

The Archeological Sites Management Information System (ASMIS) and List of Classified Structures (LCS) are the primary tools for monitoring the condition of archeological sites and historic structures (including buildings and landscape features) that form portions of the Cultural Outstandingly

Remarkable Value. For components of the Cultural Outstandingly Remarkable Value that derive significance from association with and ongoing use by traditional cultural groups (e.g., continuing traditional use, traditional gathering places), monitoring protocols are yet to be developed. While the monitoring of these resources is part of the long-term strategy for addressing user capacity within the Merced River corridor, it is not part of this preliminary effort.

Both ASMIS and LCS are described in more detail below. The tables "Cultural Outstandingly Remarkable Values and Monitoring Protocols" provide the concordance between individual elements of the Cultural Outstandingly Remarkable Value and the monitoring protocol currently used to track the condition of these resources in the Merced River corridor.

Archeological Sites Management Information System (ASMIS)

The Archeological Sites Management Information System (ASMIS) is the National Park Service's database for the basic registration and management of park prehistoric and historic archeological resources. The ASMIS documents site location, description, significance, condition, threats to and management requirements for known park archeological sites. It serves as a tool to support site preservation, protection, planning and decision-making. The ASMIS is a fundamental program management tool that provides the ability to determine how well the National Park Service is achieving its long-term site management objectives. The system tracks changes in the condition of archeological resources, and documents site-specific threats, disturbances, and recommended management actions.

The National Park Service uses ASMIS systematically to document archeological sites and maintain a running record of site condition, threats and disturbances (among other site attributes). At Yosemite, ASMIS information is collected as a regular part of ongoing archeological inventory. In the Merced River corridor, ASMIS information is collected for the prehistoric and historic archeological sites that form part of the Cultural Outstandingly Remarkable Value whenever project-based inventory is conducted within the river corridor. This inventory work is typically conducted in support of special-funded projects such as development proposals, wilderness restoration, and fire management actions.

List of Classified Structures (LCS)

The List of Classified Structures (LCS) is the National Park Service's primary computerized database for registration and management of park historic and prehistoric structures. Data fields in the LCS include identification, category of significance, condition, use, threats, treatments, cost estimates for treatments, and physical description. Similar to the ASMIS, the LCS is a fundamental program management tool for tracking information about the long-term management of historic and prehistoric structures.

The National Park Service uses the LCS systematically to track threats to and the condition of registered structures. The LCS is updated on a 6-year cycle, with current information collected regarding threats to and condition of each historic structure. This LCS update is the mechanism by which Yosemite will monitor the condition of historic structures that form part of the Cultural Outstandingly Remarkable Value within the Merced Wild and Scenic River Corridor.

Cultural Outstandingly Remarkable Values and Monitoring Protocols

The following tables provide the concordance between individual elements of the cultural Outstandingly Remarkable Value and the monitoring protocol currently used to track their condition.

Main Stem Merced

Wilderness Segment	
Cultural ORV	***Monitoring Protocol***
Portions of prehistoric trans-Sierra route	ASMIS
Archeological sites	ASMIS
Homestead sites	ASMIS
Trails & river crossings	LCS
High Sierra Camp sites	ASMIS
High Sierra Camp structures	LCS
Valley Segment	
Cultural ORV	***Monitoring Protocol***
Archeological sites	ASMIS
Continuing traditional use	Plan under development
Designed landscapes and developed areas	LCS
Historic buildings and circulation systems	LCS
Gorge Segment	
Cultural ORV	***Monitoring Protocol***
Archeological sites	ASMIS
Historic structures	LCS
El Portal Segment	
Cultural ORV	***Monitoring Protocol***
Archeological sites	ASMIS
Historic Indian villages	ASMIS
Traditional gathering places	Plan under development
Historic structures	LCS

South Fork Merced River

Wilderness Segment	
Cultural ORV	***Monitoring Protocol***
Archeological sites	ASMIS
Historic stock use and cavalry sites	ASMIS
Wawona Segment	
Cultural ORV	***Monitoring Protocol***
Archeological sites	ASMIS
Historic sites	ASMIS or LCS
Historic structures and landscape features	LCS
Below Wawona	
Cultural ORV	***Monitoring Protocol***
Archeological sites	ASMIS
Historic cavalry trails	ASMIS or LCS

Standards and Guidelines for Management Actions

Director's Order 28

The National Park Service operates within legislative, regulatory and policy direction for managing, preserving and protecting the historic resources that comprise the Cultural Outstandingly Remarkable Value for the Merced Wild and Scenic River. These resources are finite and nonrenewable, a consideration that is reflected in the detailed and thorough nature of the agency's guidance for management. The primary reference containing information regarding this management is *Director's Order 28: Cultural Resource Management* (National Park Service 1998). This Director's Order provides the basis for agency cultural resource programs on research, planning, stewardship, and resource treatment.

Advisory Council on Historic Preservation's criteria of effect and adverse effect

Protection of the historic resources that comprise the Cultural Outstandingly Remarkable Value is determined by the threshold of effect and adverse effect, as defined by the Advisory Council on Historic Preservation in 36 CFR 800.9. Although these definitions have been developed in reference to planned federal undertakings, the definitions are applicable to the user capacity discussion because they quantify resource degradation that warrants a responsive management action. This standard, or threshold, does not vary by segment or management zone; it is applied consistently to all aspects of the Cultural Outstandingly Remarkable Value in the Merced River corridor. According to the Advisory Council, effect and adverse effect are defined as follows:

An "…effect on a historic property…" may alter characteristics of the property that may qualify the property for inclusion in the National Register. An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

1. Physical destruction, damage, or alteration of all or part of a property
2. Isolation of the property from or alteration of the character of a property's setting when that character contributes to the property's qualification for the National Register;
3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
4. Neglect of a property resulting in its deterioration or destruction; and
5. Transfer, lease, or sale of the property

Director's Order 28 incorporates by reference the regulatory language above, as well as the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. These guidelines provide specific direction on actions to preserve and protect the integrity of historic properties – the resource-specific management actions to be taken in response to feedback from the monitoring programs described above. Particularly applicable to user capacity are the Standards for Preservation:

Secretary of the Interior's Standards for the Treatment of Historic Properties

Secretary of the Interior's Standards for the Treatment of Historic Properties: Standards for Preservation (excerpts)

- The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
- Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

- Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

Design Guidelines for Yosemite National Park

Yosemite National Park is in the process of preparing architectural character and site design guidelines to guide development of new facilities, and redevelopment of existing facilities. These guidelines form part of the means by which the National Park Service will protect and enhance cultural, natural, and scenic Outstandingly Remarkable Values through any facility-based management actions. They are also the tools through which the National Park Service will protect natural and enhance Outstandingly Remarkable Values in the Category 3 Developed zones (3A Camping, 3B Visitor Base and Lodging, and 3C Park Operations and Administration) of the river corridor.

Guidelines are in draft form for Yosemite Valley (Phase 1; NPS 2003) and are being used as actions of the *Yosemite Valley Plan* are implemented; guidelines are anticipated for the remainder of the park (Phase 2) by 2005. These guidelines go beyond basic principles of good design to be specific to the "character" qualities that are reflected and contribute to the distinctiveness of Yosemite. The goals or intended results of the design guidelines include:

- Retention of natural site character, including setting, materials and ecological processes
- New buildings and facilities are designed to blend with the natural environment, emphasizing non-intrusive design. They are sensitive to the environmental capacity of the site to absorb modifications. Facilities fit with their sites rather than dominate them. Buildings are subordinate to the environment.
- Structures and facilities are compatible with the cultural context and character in which they are located and protect cultural integrity
- Emphasis is on simplicity and restraint in design and respect for past building character, traditions and practices.
- Coordination and integration of the design of individual structures with those of the site plan as a whole
- Enhancement of unifying architectural and landscape themes and elements within defined areas throughout Yosemite Valley.

Excerpted below are some of the specific guidelines that contribute to protection and enhancement of natural and scenic Outstandingly Remarkable Values:

- New buildings in proximity to the cliffs should address the issues of building scale and massing in the context of the steep and dramatic cliffs.
- Manage plant communities through prescribed burning, pruning, and removal to maintain views to waterfalls.
- Creeks, seasonal streams, and drainages feeding the Merced River that are designated as wetlands or have otherwise supported riparian vegetation should be restored or protected.
- Use only native plants grown from material sourced in the Valley for designated landscape projects throughout Yosemite Valley.
- Siting and scale of new structures and building clusters within developed areas should not physically or visually extend beyond designated development areas.
- Parking and parking access roads should be sited in areas of dry or naturally well-drained soils and/or conifer groves and not in or in close proximity to black oak groves, wetlands and riparian corridors tributary to the Merced River.
- Design of parking area roads should adjust to and protect natural conditions and features such as wetlands, healthy trees, boulder groupings, etc.

- Runoff and snowmelt from paved parking areas should be guided to mechanical or biologicalal filters to capture pollutants before reaching the Merced River or its tributaries.
- New bridges should be designed in a way that does not impede the flow of water. The hydrologic processes of rivers and streams should be protected during both of low and high water periods.

References

Fairley, Helen C. and Dr. Christian Downum

2000 Evaluating Elements of Archeological Site Integrity to Determine Limits of Acceptable Change: A Case Study at Wupatki National Monument, Arizona. Paper presented at The Second Workshop on the Application of the VERP Framework to Management and Protection of Non-Renewable Resources, Flagstaff, December 2000. Report on file, Archeology Office, Yosemite National Park.

National Park Service, U. S. Department of the Interior

1998 Director's Order 28: Cultural Resource Management Guideline. National Park Service, Washington D.C.

2000 Workshop on Application of Visitor Carrying Capacity Frameworks to Management and Protection of Non-Renewable Resources. Report on file, Archeology Office, Yosemite National Park.

2001 Second Workshop on the Application of the VERP Framework to Management and Protection of Non-Renewable resources: The Development of Indicators and Standards for Archeological Resources. Report on file, Archeology Office, Yosemite National Park.

2003 A Sense of Place: Design Guidelines for Yosemite National Park. Draft document on file, Yosemite National Park.

Special-Status Wildlife Species (part of the biological Outstandingly Remarkable Value)

The National Park Service uses legislation, policies, and management guidelines to address the protection and enhancement of special-status wildlife species, which are an element of the biological Outstandingly Remarkable Value. They work as the foundation for Yosemite's special-status survey program, which conducts surveys to identify critical habitats, determine population size and trends, and identify threats to special-status wildlife species. Park researchers and biologists also rely on the interagency cooperation of a number of conservation organizations. While these tools are not components of the VERP framework, they establish monitoring objectives and generate similar information regarding the overall health of special-status species in the Merced River corridor.

The following management tools assist the National Park Service in the protection and enhancement of special-status wildlife species within the Merced River corridor:

Federal Endangered Species Act

Section 7(a)(1) of the Endangered Species Act clearly states that all federal agencies should participate in the conservation and recovery of threatened and endangered species. It directs the Secretary of the Interior to utilize programs administered by them to advance the purposes of the Endangered Species Act.

Section 7(a)(2) of the Endangered Species Act requires each federal agency to consult with the Secretary of the Interior to ensure that any actions they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. The best scientific data available is to be used in fulfilling these requirements.

NPS Management Policies:

4.4.2.3 Management of Threatened or Endangered Plants and Animals

The Service will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. The Service will fully meet its obligations under the NPS Organic Act and the Endangered Species Act to both pro-actively conserve listed species and prevent detrimental effects on these species. To meet these obligations, the Service will:

- Cooperate with both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to ensure that National Park Service actions comply with both the written requirements and the spirit of the Endangered Species Act. It is particularly important that his cooperation includes the full range of activities associated with the Endangered Species Act, including consultation, conferencing, informal discussions, and securing of all necessary scientific and/or recovery permits.
- Undertake active management programs to inventory, monitor, restore, and maintain listed species' habitats, control detrimental non-native species, control detrimental visitor access, and re-establish extirpated populations as necessary to maintain the species and the habitats upon which they depend.
- Manage designated critical habitat, essential habitat, and recovery areas to maintain and enhance their value for the recovery of threatened and endangered species.
- Cooperate with other agencies to ensure that the delineation of critical habitat, essential habitat, and/or recovery areas on park-managed lands provides needed conservation benefits to the total recovery efforts being conducted by all the participating agencies.
- Participate in the recovery planning process, including the provision of members on recovery teams and recovery implementation teams where appropriate.

- Cooperate with other agencies, states, and private entities to promote candidate conservation agreements aimed at precluding the need to list species.
- Conduct actions and allocate funding to address endangered, threatened, proposed, and candidate species.

The National Park Service will inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species, to the greatest extent possible. In addition, the Service will inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance.

The Service will determine all management actions for the protection and perpetuation of federally, state, or locally listed species through the park management planning process, and will include consultation with lead federal and state agencies as appropriate.

Yosemite Survey Program

Yosemite National Park has carried out surveys for endangered, threatened, and rare species with a focus on those species judged to be most at risk, to identify critical habitats, determine population size and trends, and identify threats. Such species have included valley elderberry longhorn beetle, Yosemite toad, mountain yellow-legged frog, great gray owl, California spotted owl, willow flycatcher, Pacific fisher, Sierra Nevada bighorn sheep, and a variety of bat species. Data gained in surveys and other forms of data collection are used to protect these species and their habitats in conformance with the Endangered Species Act, and other regulations, and to integrate recovery efforts. For example, surveys for valley elderberry longhorn beetles have led to identification of critical habitat, and have shaped development and operations, through extensive consultation with the U.S. Fish and Wildlife Service.

Through thorough analysis of potential impacts, it is ensured that adverse impacts to endangered, threatened, and rare species from park operations and development are avoided or minimized. Park biologists and outside experts are consulted during planning phases of projects and operations to identify threats, and monitor resulting activities for adverse impacts. NEPA compliance is followed, including formal and informal consultation with the U.S. Fish and Wildlife Service concerning possible effects on special-status species. Park biologists work with adjacent land management agencies to protect endangered, threatened, and rare species and their habitats that form the regional populations of which the park's wildlife is a part. They also participate in interagency conservation teams for the Yosemite toad and mountain yellow-legged frog.

Research relevant to the preservation of endangered, threatened and rare species has been designed and implemented for species such as mountain yellow-legged frog, great gray owl, California spotted owl, Pacific fisher, and various bat species.

NPS 77 Natural Resources Management Guideline
Endangered, Threatened, and Rare Species Management

Policy and Program Objectives

1. Inventory and monitor sensitive, candidate, and listed species. This includes mapping species' distribution in the park, identifying critical habitats (if any), and determining numbers of individuals, threats to the species, condition, and population trends.
2. Manage endangered, threatened, and candidate species and their critical habitats, in conformance with the Endangered Species Act, recovery plans, and other appurtenant documents.
3. Ensure that park operations do not adversely impact endangered, threatened, candidate, or sensitive species and their critical habitats, within or outside the park.
4. To the extent possible, ensure that activities, projects, or programs outside the park do not adversely impact endangered, threatened, candidate, or sensitive species and their critical habitats within the park.
5. Integrate to the fullest extent possible park management actions with other federal, state, and private recovery efforts.
6. Ensure appropriate consideration of federal and state listed species and other special status species in all plans and NEPA documents.
7. Encourage NPS involvement on recovery teams as appropriate.
8. Design and implement research relevant to the preservation of candidate, rare, sensitive, and listed species.
9. Thoroughly document recovery actions and considerations.

Page 275

III. Management of Candidate Species and State Endangered and Threatened Species

Management of these species should, to the greatest extent possible, parallel the management of federally listed species. In the absence of approved recovery plans, subject matter experts from federal, state, or private entities (e.g., The Nature Conservancy's Natural Heritage Program) should be consulted to assist in establishing priorities for management actions.